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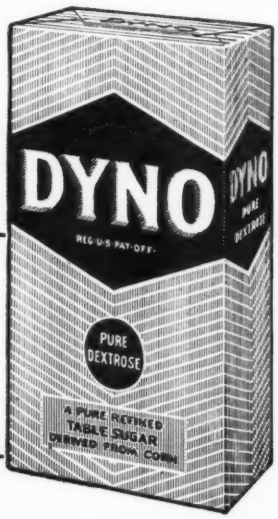

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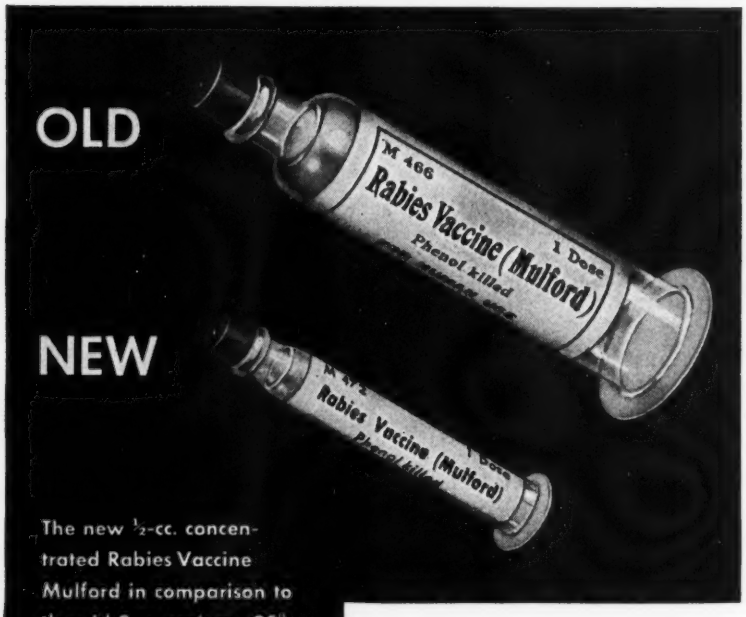

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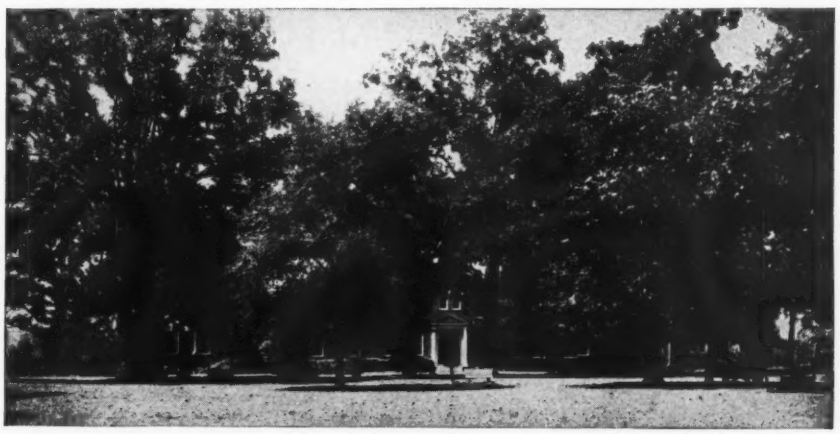

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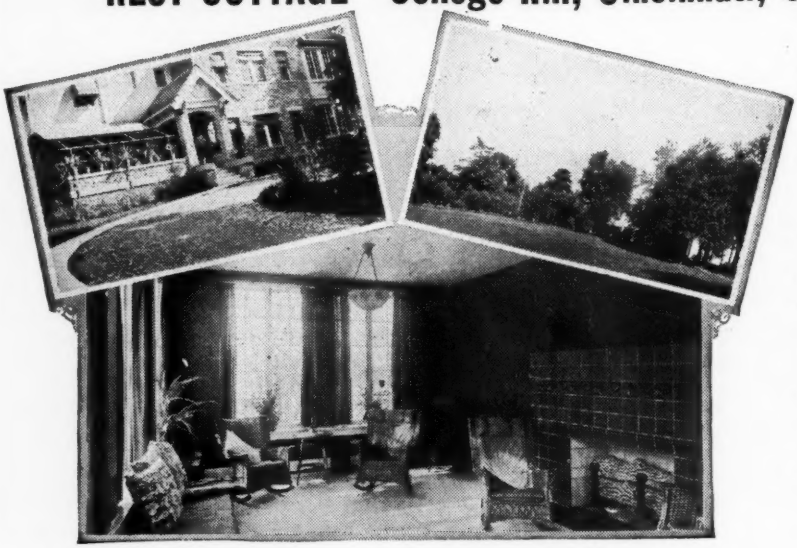

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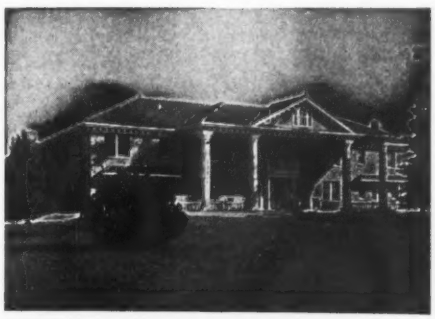

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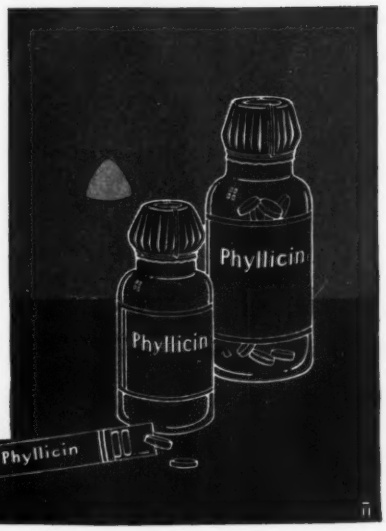

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A REPORT ON APPLICATION OF SMITH-PETERSEN NAIL IN FRESH FRACTURES OF THE FEMORAL NECK BY ADAPTION OF A SIMPLIFIED TECHNIC*

By W. B. CARRELL, M.D.,
Dallas, Texas

The method to be described is a closed reduction of the fracture and introduction of the Smith-Petersen nail through the trochanter, neck and head, aided by a drill previously placed and checked by roentgenograms. The method is so similar to that described by Westcott and by others who have used the combination of Kirschner wire and Smith-Petersen nail that it should not have the claim of a new procedure, but is believed by the author to have some features desirable when internal fixation is to be applied for the fracture. All new methods offered, and the many modifications suggested, do not, combined, give as great measure of improvement in end results as did the single contribution of the author who devised what is generally known as the abduction method of treatment. Dr. Whitman believed that poor results were due to failure in getting apposition of the fragments and conceived the method which would place the fractured ends in contact and maintain them in this position during convalescence. Since the Whitman method has been generally used throughout the country the mortality has been reduced from 50 to 15 per cent. Osseous union by older methods, not greater than 12 per cent, was raised to 60 per cent. Even though results by this method are remarkable, the remaining 40 per cent of nonunion indicates that the abduction plan does not accurately reduce all fractures, or plaster fixation is not adequate to hold reduction, or that other factors which relate to this particular type of injury are present and contribute to failure in healing.

Ledbetter, working on the first and second hypotheses, has appreciably improved the above percentages of good results by more accurate reduction and more stable fixation in a non-padded plaster.

Factors other than imperfect reduction and fixation which influence union in neck fractures are found in relation to the anatomical distribution of blood vessels in the femoral head and to interposition of soft tissue between the fragments.

The femoral head suddenly deprived of its major blood supply following a fracture may undergo aseptic necrosis. This is apparent later in roentgenograms by increased density, because normal decalcification is absent. It may remain as a dead or sequestrated head, or may become revitalized as demonstrated by Phemister and Santos in a process of creeping substitution. The head fragment resting in the acetabulum may become revitalized even though it is not in contact with the distal fragments. This process, however, is imperfect, the head atrophies and the hip continues in nonunion. When the head fragment remains in good contact with the distal fragment, even though a long period of time elapses for the evolutionary changes, union may finally occur, but usually with distortion of the head and neck.

In the reaction of the femoral head it is apparent that revitalization takes place from new blood vessels brought in either through the distal fragment when contact is good or in circulation through the capsule and soft tissues adherent to the capital fragment, when the fractured surfaces are not in contact. When approximation is adequate for revascularization through the femoral neck the chances of union are good. They are in direct relation to the

*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

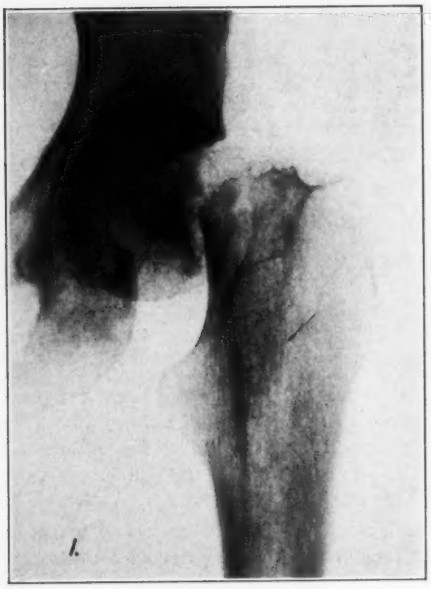

Fig. 1
Recent fracture.

Fig. 3
Reduction, lateral view.

Fig. 2
Reduction, anterior posterior view.

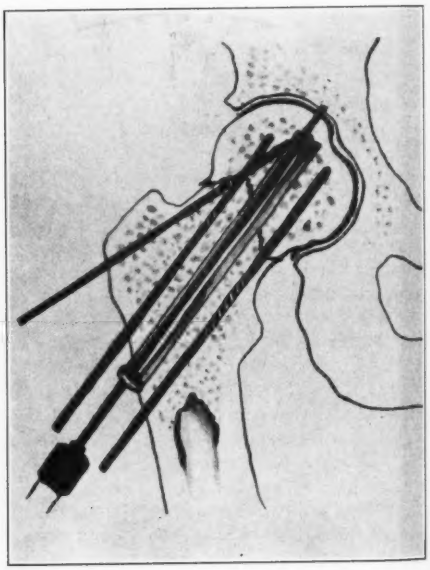

Fig. 4
Schematic.

Fig. 5
Nail being driven up and following drill into head. Drill should penetrate acetabulum for better fixation of head.

accuracy of contact and permanency of fixation. Impacted fractures almost invariably unite.

From these observations it appears that the ideal treatment would be to approximate as nearly as possible the conditions which are found in an impacted fracture in perfect anatomical position.

Smith-Petersen's work follows this principle and the only objection to his operation is the X— procedure of complete exposure of the hip. If some technic as other methods for introducing the nail after a closed reduction should prove satisfactory, it would seem that we have the ideal treatment for this fracture.

In following such a modification the author has not been impressed with the importance of soft tissue interposition, and believes that manipulation displaces all but a few remnants which do not interfere greatly with revascularization. In operations on old fractures much soft tissue is found over the fragment surfaces. In several early cases exposed after a closed reduction has been done, no appreciable soft tissue was found intervening. When, however, the fracture had been exposed before any reduction was attempted portions of capsule were invariably found between the fragments. From these clinical findings it was believed safe to modify Dr. Smith-Petersen's operation in introduction of the nail without exposure of the hip. The end

Fig. 6
Nail in position 6 weeks after operation. Note impaction.

Fig. 7
Same case 16 months after operation.

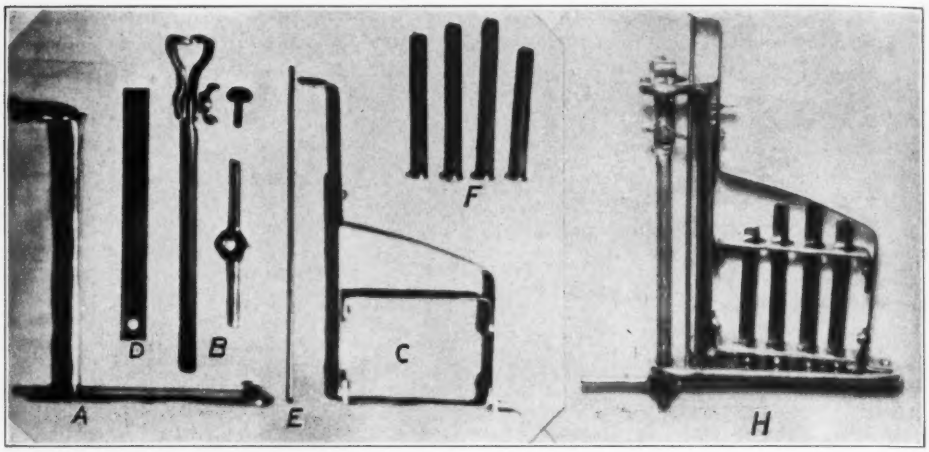

Fig. 8

results on the cases here reported, together with those of Westcott and others, add confirmation to the belief that interposition of capsule is of little consequence, but impaction is the essential thing for obtaining solid union. At this time some laboratory experiments are being done to determine the fate of soft tissue left between impacted bones, but the results are not complete.

The procedure is as follows:

(1) Reduction of the fracture by manipulation (preferably Ledbetter method) with local or general anesthetic (*Fig. 1*).

(2) Radiogram anterior posterior and lateral (*Figs. 2* and *3*).

(3) Incision over trochanter and insert 1/16 inch drill, length 8 inches, through trochanter, neck, head and engage acetabulum (*Fig. 4*).

(4) Radiogram for satisfactory position.

(5) From study of radiogram and length of drill in bone the proper size of nail is selected and threaded on drill and driven up (*Fig. 5*).

(6) With instrument against trochanter firm impaction is made.

(7) Additional drill holes, 2 or 3, are made around nail for circulatory channels (*Fig. 4*).

(8) Convalescence.

Following operation plaster leg supports are applied from the calves to and including the feet. Two cross bars control rotation and maintain moderate abduction. The patient is permitted a back rest, *ad libitum* and a wheel chair after 4 weeks. Splints are bivalved after 3 weeks, but worn for 6 weeks. After 8 weeks a ring support, pelvic band brace, permits the

Case	Sex	Age	Operation	Union Firm	Nail Removed	Walked Without Apparatus	Function
R.R.	F	60	1/33	10 months	15 months	16 months	Good
B.A.	M	40	5/33	12 months	No	12 months	Good
J.A.	F	54	6/33	8 months	No	8 months	Good
D.D.	F	72	3/34	8 months	No	9 months	Good
J.N.	F	71	12/33	6 months	11 months	7 months	Good plus
H.N.	F	70	3/33	5 months	No	8 months	Good plus
O.N.	F	73	12/33	8 months	8 months	10 months	Good
V.B.	F	54	5/33	12 months No union	12 months Multiple drilling	18 months Union doubtful	Wearing brace*

Total eight cases, union firm 15 months or less in seven. *3/15/35: last case reported as nonunion. Union now almost complete, motion good, can walk without brace, slight limp. Will continue brace another sixty days.

patient to get about on crutches. The brace should be worn 6 months as a minimum time and discarded only when radiograms show firm union. The nail can be removed under a local anesthetic when union is firm. In one case (*Case 8*), delayed union, the nail was removed, the neck re-drilled with 1/16 inch drill 12 months after operation, and 10 months following this procedure union was firm.

The instruments (*Fig. 8*) are made in the brace shop. The impactor (a) assembled with (b) makes the nail extractor and completes the frame for the unit (h). Nails (f), Smith-Petersen type, are made of one piece rustless steel with a hole through the head to receive the drill. On introduction the nail rests against the drill and has no tendency to wander off at an angle when driven up. The drill (e) is 1/16 inch, 8 inches long and made of rustless steel bar, with the end sharpened as a drill point. Any hand drill with a suitable chuck is satisfactory. (d) Metal scale.

Good function indicates a comfortable, easy gait, very little, if any, limp, 90 degrees or more of flexion and fair abduction and rotation.

All patients are advised to have nail removed when union is firm, but some have postponed this for various reasons.

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DISCUSSION (*Abstract*)

Dr. Edward S. Hatch, New Orleans, La.—It is a fact well-known to all of us that open operative procedures of whatever nature on fractured bones invariably slow up the process of bone repair. Therefore, open reduction in fractures should be avoided whenever it is humanly possible.

About twenty years ago, I nailed up a good many fractured femurs, using a staggered nail, and had a fair measure of success. Since using Dr. Whitman's method, and also the changes in reduction methods advised by Dr. Ledbetter, I, personally, feel that the method leaves little to be desired.

Many men say that their patients complain bitterly of the discomfort of plaster casts when the Whitman method is used. I have not had this trouble, and find that if we are careful in applying a cast patients experience little discomfort and heal rapidly. This is true even in very elderly patients.

The late Dr. Martin, of New Orleans, a few years ago was in the habit of putting two long wood screws through the neck of the femur into the head, with very good results. I feel that Dr. Carrell's modification for placing the Smith-Petersen nail in position is an excellent one.

Dr. J. E. M. Thomson, Lincoln, Neb.—The method described by Dr. Carrell for applying the Smith-Petersen nail has done more to popularize its use in my own surgery than anything contributed by the author of this method of treating fractures of the neck of the femur. The fact that by Dr. Carrell's method one is able to check the course of the nail through the fragment is vitally important for those who have only an occasional case for which this treatment is appropriate. Another point of importance is the fixation of the head in the acetabulum by the drill while the nail is being driven into place. I was impressed very recently by seeing a group of cases treated with the Smith-Petersen nail, in which the apposition of the fragments was in no wise perfect, yet all of them had good bony union and a satisfactory functional result. It has always been my practice to obtain adequate reduction of fragments before such a procedure is considered. Apparently, however, it would seem from the cases in the group referred to, that the irritation and osteoblastic activation occurring with the introduction of the nail produced some revascularization in the head of the femur, thereby contributing to the bony union.

For a great many years I have depended on the double-leg casts, a sort of "well-leg" type of traction in the Whitman position, for treatment of fractures of the neck of the femur with exceedingly satisfactory end results. After reduction of the fragments and immobilization in plaster of Paris casts this type is a relatively simple matter to fenestrate or make an ample window over the great trochanter and place the nail in the fragment, after the manner described by Dr. Carrell. When wound healing has taken place the cast can be removed and the patient allowed more freedom. In spite of the fact that union may occur with poor position of the fragments when a Smith-Petersen nail is applied, it seems more logical to insure and maintain a good reduction at the time that the nail is introduced.

I feel that we should recognize our indebtedness to Dr. Carrell for presenting this very interesting subject, and I feel that this is a distinct contribution towards popularizing the use of the Smith-Petersen nail.

Dr. Earl D. McBride, Oklahoma City, Okla.—I have never used the Smith-Petersen nail. I think that something more than a plaster support is essential. I have accomplished reduction and apposition by the Whitman method, but have found that the insertion of a Kirschner wire through the condyles of the femur and incorporating it in plaster is a valuable adjunct in controlling inward rotation and traction. When this is done, it is not necessary to include the ankle and foot on the injured side in plaster. In cases thus treated, after three weeks I have permitted the patient

to stand upright and to move about on crutches. The plan of fixation without internal appliances seems preferable to me.

Dr. F. Walter Carruthers, Little Rock, Ark.—With all respect for the merits of the Smith-Petersen nail, I am personally not sold on it. While it has some splendid possibilities, I believe that many new technics will be offered by surgeons before this particular method is perfected.

TRUE PROSTATIC CALCULI*

By HAMILTON W. MCKAY, M.D.,
and
G. AUBREY HAWES, M.D.,
Charlotte, North Carolina

The purpose of this discussion is to review the literature, to emphasize the frequency of the disease and to report several cases directing attention to unusual symptoms which caused two of our cases to seek surgical advice. In carefully selected cases we illustrate the possibility or advisability of using the resectoscope in unroofing stone beds and subsequently in removing the calculi.

True stones in the prostate are not so rare as was formerly supposed. Kretschmer, in 1918, reviewed the literature and reported a total of one hundred seventy-three cases. Eight of these he had in his own practice. Writing the second time in 1927 on prostatic concretions, Kretschmer reported seventy-six personal cases. The great increase he ascribed to routine radiograms by which cases were diagnosed which would otherwise have been overlooked.

Age.—Prostatic stones may occur at any time of life, but usually they occur between the ages of forty and sixty years. In Kretschmer's series over 70 per cent occurred between the ages of forty and seventy years, the greatest number between fifty and sixty years.

Formation.—The etiology of true prostatic concretions is still questionable. Clinically we are aware that true prostatic stones are associated with certain diseases of the prostate, especially the obstructive type of prostatic disease. Hypertrophy, either benign or malignant, median bar, or contracture of the bladder neck, may be complicated by stones in the true prostatic capsule. Some authors tell us that stones accompany prostatitis, but it is more likely that prostatic stones either cause, prolong or aggravate a prostatitis. The view that we like most is the one of Sir Henry Thompson, concurred in by J. Swift Joly. We quote from Hamer and Dykhuizen:

"According to this view, true prostatic calculi are formed by deposits of calcareous material on the corpora amylaceae which are frequently met with in sections of apparently normal glands. The corpora amylacea are small round or oval bodies frequently found in the alveoli of prostate glands. They are usually found in the glands of an adult and become larger and more numerous in old age. On section they are often formed around desquamated epithelial cells and are distinctly laminated. They are chiefly formed of a nitrogenous material of an albuminoid nature and usually contain some lecithin. They show a great tendency to calcify and in men of middle age they are invariably impregnated with lime salts. After acquiring a layer of lime salts they are no longer true corpora amylacea, but become prostatic calculi. Joly advances the view that the deposition of calcium is brought about by a difference in surface tension between these minute bodies and the surrounding prostatic fluid. Thompson explained the calcium deposition by assuming that the corpora amylacea, after attaining a certain size, act as an irritating agent, thus causing a deposit of calcium salts similar to that which occurs in the bladder in the presence of a foreign body."

A positive history of gonorrhea is obtained in approximately 30 per cent of cases. Undoubtedly stricture formation in the anterior urethra with subsequent obstruction and infection in the

Fig. 1

Calcareous degeneration of prostate showing a true mould of the outline of the gland. Note sharp delineation of prostatic notch. (Case reported previously by author, S. M. & S., April, 1925.)

*Read in Section on Urology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

Fig. 2, Case 1
Male, aged 44. Roentgenogram showing one very large prostate stone and numerous smaller ones.

prostatic urethra plays an important role in the formation of prostatic concretions.

Associated Pathology.—In some cases stones are found during complete physical examination with the aid of radiograms, when no symptoms are referable to the prostate. In other cases, there may be evidence of disease in other organs which overshadow any symptoms due to the presence of prostatic stones. Conditions such as chronic low grade prostatitis, urethral stricture, and prostatic hypertrophy are very frequently associated with prostatic calculi. Less frequent associated pathological conditions are urethral stones, periurethral abscesses, stones in the kidney, bladder and ureter, median bar, abscess of the prostate, and carcinoma of the prostate. Authorities in the past have stated that carcinoma of the prostate and prostatic stones do not occur in the same patient, but Kretschmer has reported five such cases.

It is a very significant fact that true prostatic calculi are almost invariably multiple. Some authors believe that cases where a single stone has been removed are examples of urinary stones which have become lodged in the prostate. True prostatic stones are usually small, rounded without facets, of a dark brown color, scattered indiscriminately throughout the substance of the gland, and give a characteristic dotted appearance in the radiogram.

Fig. 3, Case 1
Male, aged 44. Actual size of stones according to scale. Note size of large calculus. These were removed by perineal section.

Fig. 4, Case 2
Roentgenogram showing number, size and position of multiple prostatic stones. Note rectangular shape of stone near rectum. Male, 72.

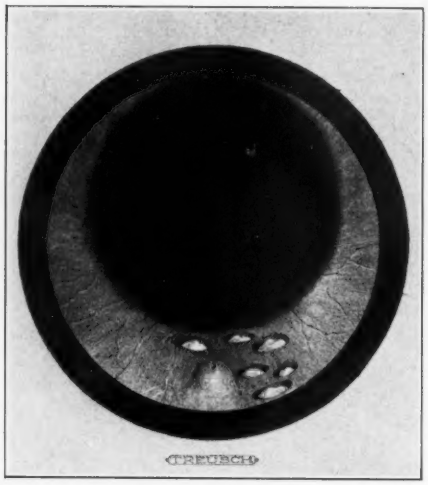

Fig. 5, Case 2
Stones which have ulcerated through floor of prostatic urethra, responsible for intermittent hematuria, which was the important symptom in this case.

Chemistry of Stones.—The nucleus is of an albuminoid nature, but apparently not a true protein. It may consist of epithelial detritus, a clump of bacteria, a blood clot, corpora amylacea, or necrotic tissue as a result of abscess formation. The surrounding laminated layers are composed of inorganic salts such as calcium phosphate, magnesium phosphate, ammonio - magnesium phosphate, potassium phosphate, calcium carbonate, and calcium oxalate. The amount of inorganic salts varies directly with the size of the stone. A stone in cross section shows clearly the nucleus which is cellular in character, and the concentric rings which are composed essentially of earthly material.

Symptoms. — The most significant fact to be pointed out in discussing the symptomatology of prostatic stones is that there is no pathognomonic symptom. However, there is one symptom which has not been stressed in the literature in the past and one that we believe to be most important, namely, hematuria. Two of our cases reported in this paper consulted us on account of hematuria alone; this symptom bringing them to the surgeon. The bleeding may be profuse or intermittent and small in amount. When prostatic calculi are suspected, we believe that if the patients are carefully questioned in regard to this symptom, frequently a positive history of hematuria will be obtained. The usual urinary symptoms that are present in most cases of obstruction are frequency, urgency, difficulty in voiding, incontinence, dribbling and diminution in the size of the stream. Less frequent symptoms are loss of sexual vigor, perineal pain, and painful defecation.

Clinical Diagnosis.—The final diagnosis of prostatic calculi depends upon the x-ray. Not infrequently, however, a presumptive diagnosis and rarely a positive diagnosis can be made by other methods. Upon digital-rectal examination one is frequently impressed by the unusual firmness of the gland, and possibly a slight irregularity suggestive of a nodule or stone. Crepitation is a physical finding which has been stressed by some authors, but is absent in many cases. It is usually present when the stones occur in beds, as will be pointed out in two of our cases. Occasionally the prostate is normal to digital-rectal examination.

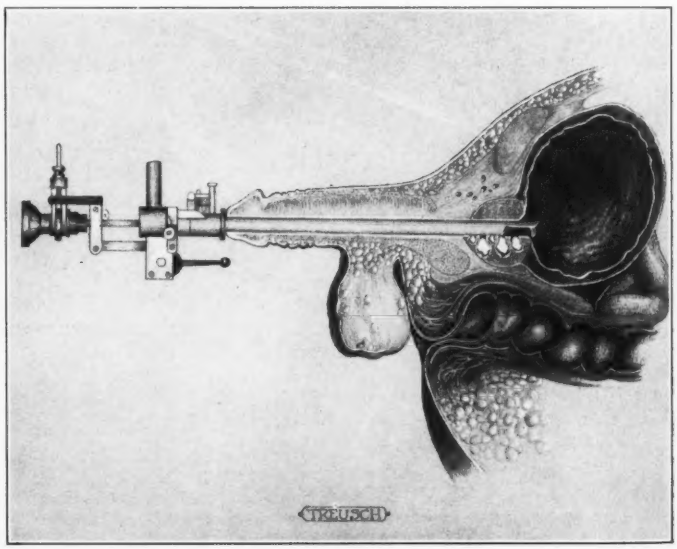

Fig. 6, Case 2
Illustrating first step in unroofing stone beds in operation of removal by resection.

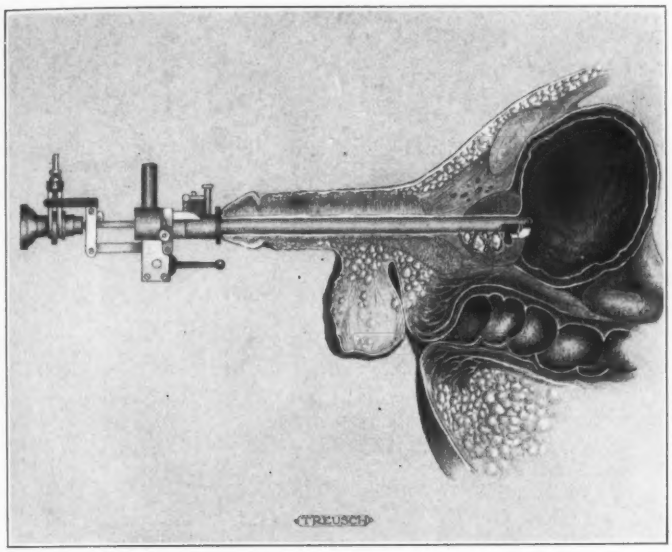

Fig. 7, Case 2
Dislodging single stone in unroofing process. (c) After unroofing stone beds one by one, intentionally rolling stone into bladder.

With the aid of the cysto-urethroscope, occasionally one may be able to visualize the calculi in the prostatic urethra if they have ulcerated through as in one of our cases here reported. Prostatic calculi should be suspected in all cases of prostatitis which for insufficient reason do not show improvement.

Properly taken roentgenograms almost always demonstrate the presence or absence of calculi. Radiograms, besides establishing the diagnosis, also indicate the size, number and position of the calculi present.

Choice of Operation. — Assuming that operation has been decided upon, the size, number and position of the stones, and also the complicating pathology of the prostate, are some of the factors which should be considered in selecting the type of operation. It is well-known to all urologists, the perineal route and approach through a suprapubic cystotomy are the methods usually employed. Many authors seem to stress the perineal approach as preferable.

We should like to commend the use of the resectoscope in carefully selected cases, first, to unroof the stone bed; second, to take the cutting loop and if the stone is large to push it in the bladder and then with a rolling motion roll it out through the sheath of the Mc Carthy resectoscope, this procedure being accomplished by manipulating the stone with the cutting loop; third, such portion of the prostate as is obstructing may be removed at the same sitting. This procedure is well illustrated by a case reported in this series, where the stones had ulcerated through the prostatic urethra and the beds could be easily unroofed, the stones pushed in the bladder and removed as described above.

REPORT OF CASES

Case 1.—W. B., aged 44 years, was first seen in October, 1929, with a history of multiple attacks of gonorrhea, following which he noticed that his urinary stream

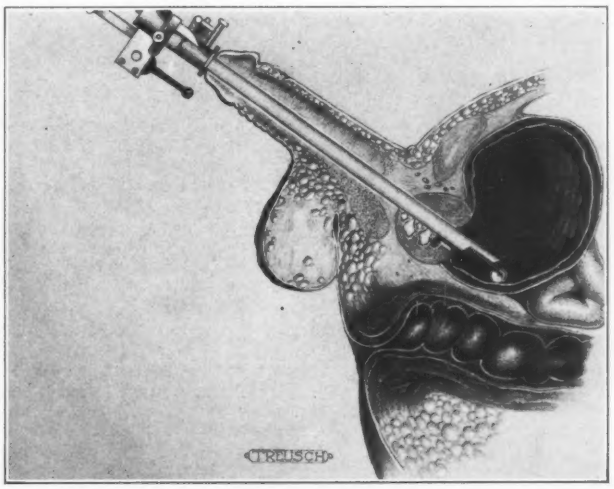

Fig. 8, Case 2
Removing medium size stone through sheath with cutting loop.

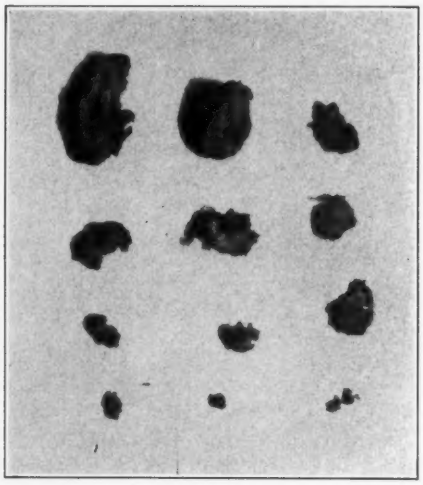

Fig. 9, Case 2
Amount of tissue removed in unroofing process by resection.

became small. There occurred in the perineum a swelling which developed into an abscess and ruptured. Since that time he had had difficulty of urination combined with the passage of urine and pus from the fistulous tract.

Examination revealed beaded fibrosis along the urethra. At the bottom of the scrotum, where the scrotum joins the perineum, there were three fistulous openings. On digital-rectal examination at the apex of the prostate was a stony hard area where definite crepitation was felt. The urethral strictures were dilated to 18 F. and a child's cystoscope then used. Upon entering the prostatic urethra, the cystoscope grated against the stone. When the water was running through the cystoscope, one could see a stone around which were many granulations bleeding profusely. X ray examination showed multiple calculi, one of which was almost as large as a pigeon's egg.

On October 22, 1929, under caudal anesthesia, the prostate was exposed perineally. It was found that the stones lay in the true prostatic tissue beneath the mucous membrane of the rectum and so obstructed the lumen of the urethra as to produce difficulty in urination. They were lifted out and consisted of two large and two small round calculi. The finger was then passed into the bladder and a sclerotic internal vesical sphincter was palpated and dilated with a pair of curved forceps. After this the bladder was carefully explored with the index finger, and no further stones were found. A catheter was passed through the urethra and placed in the bladder. The incision was closed in the usual manner and the patient returned to his room.

The patient made an uneventful recovery and was discharged four weeks following the operation.

Case 2.—J. I. D., aged 72 years, entered the hospital on July 8, 1933, with a history of painless, recurrent hematuria since 1882. He dated the onset of hematuria following an attack of "enteric fever." Associated with

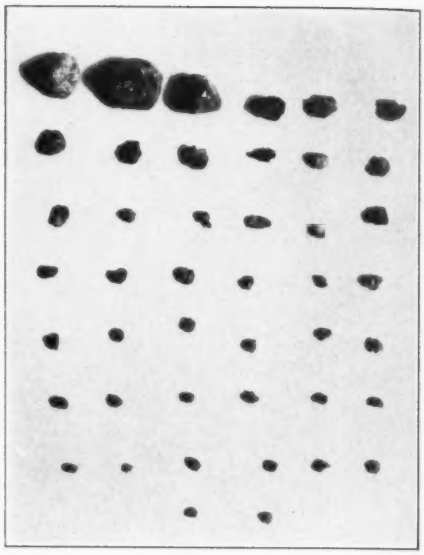

Fig. 10, Case 2
Showing actual variation in size and shape of stones removed. This is a typical illustration of true prostatic stones.

Fig. 11, Case 2
Patient symptom-free for sixteen months after operation. Cuts show cavity of small rectal abscess packed with iodized oil. Urine negative. No urinary symptoms. Rectangular shaped stone shown in Fig. 4, causing rectal abscess which ruptured into rectum.

Fig. 12, Case 3

Grade two adenomatous hypertrophy complicated by multiple stones. Patient had sudden alarming urinary bleeding without symptoms of prostatism. Prostatic resection done with good results.

this was occasional nocturia and some tenesmus. There was no kidney colic. His past history was essentially negative. His family history revealed that one brother died with tuberculosis.

The general physical examination was negative, except for the prostate. On digital-rectal examination the prostate was stony hard with irregular surface and definite crepitus was elicited when the finger was passed over the prostate. On cystoscopic examination, several concretions had ulcerated through the prostatic urethra and were causing bleeding.

X-ray examination revealed multiple calcified shadows scattered throughout the prostatic area, the size of which varied from a large grain of sand to that of a field pea.

On July 15, 1933, under caudal transsacral anesthesia, about eight cuts were taken out of the prostate, chiefly out of the left lobe, with the McCarthy electrotome. This was in reality an unroofing process. The stones were manipulated out of their beds, which were in the prostatic capsule, into the bladder and prostatic urethra. In all three large stones and about thirty-six small ones were removed.

The patient had no bleeding following the operation, had no complications, and was discharged from the hospital free of fever, with a small amount of pus in the urine. Of special interest in this case is the fact that this patient saw his family physician one year and three months after operation, complaining of rectal pain. He was again referred to us, and no urinary symptoms could be elicited. Examination of his urine showed no abnormalities. On rectal examination a break in the rectal mucosa just within the internal sphincter was visualized, and pus was exuding from this break. Iodized oil was injected into this opening and a radiogram demonstrated a cavity in the prostate. Evidently, this was a prostatic abscess that had ruptured into the rectum.

Case 3.—W. H. P., aged 65 years, was first seen on March 10, 1933, with a chief complaint of profuse painless hematuria. Immediately before the onset of symptoms the patient took an automobile trip of one thousand miles. On his return he began to have rather profuse painless passage of blood. There was no straining, terminal hematuria, nocturia, frequency or diminution of force of stream. Past history and family history were essentially negative. There was no venereal infection.

Abdomen and external genitalia were negative. On digital-rectal examination the prostate was moderately enlarged, symmetrical, firm, elastic, not tender, nor adherent. There was no third degree induration palpated.

Radiogram demonstrated typical prostatic calculi shadows on the left side of the prostate.

On July 14, 1933, under caudal transsacral anesthesia, a prostatic resection by McCarthy technic was done. No stones were obtained during the operation.

The patient made an uneventful recovery and left the hospital eight days after operation. He was voiding a good, forceful stream.

CONCLUSIONS

(1) With the taking of routine radiograms true prostatic calculi have become a relatively common clinical entity.

(2) It is of interest that prostatic concretions are almost invariably multiple.

(3) Prostatitis treated intelligently without improvement, and without assignable reason for lack of improvement, may be due to or aggravated by prostatic calculi.

(4) Hematuria, although formerly mentioned as an occasional symptom, in our series of cases was an outstanding and most important objective symptom.

(5) In carefully selected cases, the resectoscope offers a most efficient instrument for operation.

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ADENOFIBROMA (FIBRO-ADENOMA) MALIGNUM OF THE BREAST*

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and
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The adenofibroma of the breast is a benign tumor composed of both epithelial and fibrous tissues. Each of these elements may undergo malignant transformation, a change in the first converting the tumor into a carcinoma and a change in the second, into a sarcoma.

Various authors give the frequency of adenofibromata as constituting 12 to 25 per cent of all mammary neoplasms. As to the frequency with which adenofibromata undergo malignant change there are no available data. In reviewing the literature in an effort to collect the cases of adenofibromata which have undergone malignant change, one finds the terminology so varied and confusing, and the pathological details of the case records so fragmentary that one is forced to give up the hope of effecting an accurate analysis. There are recorded in the literature many cases of sarcoma and carcinoma of the breast with a history of the presence of a mass for many months and even years, but in the pathological report of these cases the possibility of their origin in a preexisting benign tumor is not mentioned. We have therefore selected only those cases of malignant tumors of the breast in which there is no doubt of their origin having been in preexisting adenofibromata.

We report two cases of adenofibromata of the breast, one of which developed into an adenosarcoma and the other into a fibrocarcinoma. The latter metastasized as an adenocarcinoma to the axillary lymph nodes.

ADENOFIBROMA OF THE BREAST WITH SARCOMATOUS METAMORPHOSIS

We have been able to collect from the literature 29 cases of sarcomata which were stated to have arisen in preexisting adenofibromata. Of these, one was reported by Friend[3] as an intracanalicular fibroma becoming a spindle cell sarcoma; 6 by Greenough and Simmons[6] as periductal fibromata becoming periductal myxosarcomata; one by Flynn[12] as an adenofibroma becoming a spindle cell sarcoma; 6 by Smith and Bartlett[13] as either intra- or pericanalicular adenofibromata becoming sarcomata; and 15 by Sophian[14] as adenofibromata, 7 becoming adenofibrosarcomata, and 8 fibrosarcomata.

REPORT OF CASE

E. F., a negro woman, aged 23 years, was admitted to the surgical service of Dr. J. L. McGehee at the Memphis General Hospital, January 31, 1931, complaining of an enlargement of the right breast with occasional intermittent pain. The patient stated that a lump had been present in this breast as long as she could remember. Three months previous to admission, while she was still nursing her nineteen months old baby, the lump began to enlarge, and had rapidly increased in size, associated with loss of weight.

Physical examination revealed the right breast to be very large and to contain a large, hard, nodular mass, with areas which were soft. The veins over the mass were enlarged. On the lateral surface of this mass was an ulcerated area involving the skin, measuring 1.5 cm. in diameter, from which there was draining a serous discharge. The mass was freely movable (*Fig. 1*). The regional lymph nodes were not palpable. The left breast appeared to be normal, except for a small lump in its upper half, which was thought to be a benign adenofibroma. It was not removed.

Roentgenograms of the lungs and long bones did not show any evidences of metastases.

Dr. J. L. Hasie, the intern, made this interesting note: "This is a sarcoma of the breast arising presumably from some form of benign mammary tumor."

A simple mammectomy was performed and the patient had an uneventful convalescence.

Fig. 1
Adenosarcoma of breast. Note great enlargement of breast and congested vessels. Photograph.

*Read in Section on Pathology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*From the Department of Pathology, University of Tennessee, Pathological Institute.

Pathological Report.—The specimen consisted of the right breast enormously enlarged and weighing 6 kilograms. A large, lobulated, partly firm and partly soft, mass could be outlined by vision and palpation, over which the skin was freely movable and perforated by a small sinus (*Fig. 2*). The sectioned surface of the breast showed this mass to be irregularly spherical, measuring 20 cm. in diameter and enucleable from the surrounding breast tissue. Much of the tumor was grayish pink, translucent and tough. The rest was grayish yellow, more translucent, succulent and easily picked away (*Fig. 3*).

Fig. 2

Adenosarcoma of breast. External surface of right half of breast showing outline of the large, lobulated tumor covered by tense skin, perforated by a sinus. Photograph.

Fig. 3

Adenosarcoma of breast. Sectional surface of right half of breast, showing the large, encapsulated, enucleable, lobulated, moderately soft in places, edematous tumor. Photograph.

Microscopic Examination.—The firmer portion of the tumor had the typical histology of an adenofibroma (*Fig. 4*), while the softer portion consisted of medium sized, spindle shaped, fibrous tissue cells, rich in mitoses with a delicate, very vascular, edematous stroma (*Fig. 5*).

Anatomical Diagnosis.—Adenosarcoma.

In this case, of importance clinically were the presence of a mass in the breast as long as the patient could remember, which increased rapidly in size during the three months before operation and was associated with intermittent pain, loss of weight and a second benign mass in the other breast.

Of the 30 cases, including our case, the age, in the 24 cases in which it was given, varied from 23 to 75 years, the average being 50.4 years. The duration of these tumors when stated ranged from three weeks to 20 years.

FIBRO-ADENOMA OF THE BREAST WITH CARCINOMATUS METAMORPHOSIS

We have collected from the literature 17 cases of carcinomata which were stated to have had their origin in preexisting fibro-adenomata. Of these, one was reported by Stewart[1] as an adenofibroma becoming an adenocarcinoma; 7 by Stone[2] as adenofibromata, 2 becoming ade-

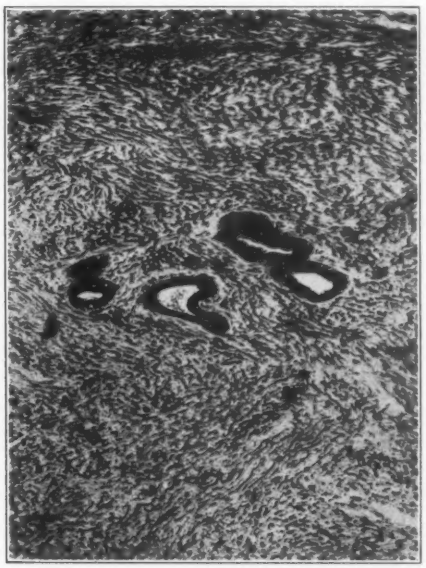

Fig. 4

Adenosarcoma of breast. Adenofibromatous portion of tumor. Note characteristic histology. Photomicrograph x200.

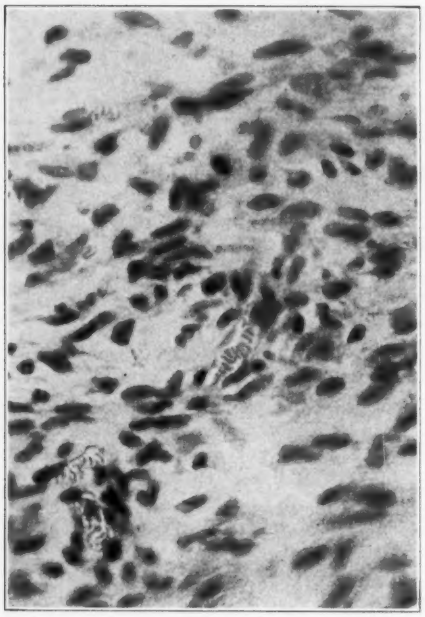

Fig. 5

Adenosarcoma of breast. Adenosarcomatous portion of tumor. Note spindle shaped, fibrous tissue cells, rich in mitoses and imperfectly formed blood vessels. Photomicrograph x750.

nocarcinomata, one medullary carcinoma and 4 carcinomata; 2 by Speese[4] as periductal fibromata becoming carcinomatous; one by Stone[5] as an intracanalicular adenofibroma becoming carcinomatous; one by Deaver[7] as a fibro-adenoma becoming carcinomatous; one by Pool[8] as an adenofibroma becoming carcinomatous; one by Semken[9] as an intracanalicular fibroma becoming carcinomatous; one by Mills[10] as a cystic fibro-adenoma becoming carcinomatous; and 2 by Lee and Cornell[11] as fibro-adenomata becoming a fibro-adenocarcinomata.

REPORT OF CASE

E. I., a negro woman, aged 43 years, was admitted to the surgical service of Dr. Frank W. Smythe at the Memphis General Hospital, November 2, 1933, complaining of a mass in the left breast. The mass was first noticed 18 months previous to her admission and had gradually become larger. There was no loss of weight.

Physical examination showed the patient to be well developed, but poorly nourished. In the upper portion of the left breast there was a nodular mass about the size of an orange, which was closely adherent to the skin, but not to the underlying tissues, and felt as if it was cystic. There was another movable tumor in the lower portion of the left breast. Lymph nodes were palpable in the left axilla.

Roentgenograms of the lungs showed no evidence of metastases.

A radical breast amputation was performed and the patient had an uneventful recovery.

Pathological Report.—The specimen consisted of the left breast and axillary lymph nodes. Above the nipple could be seen and palpated a spherical, partly firm and movable, partly soft and fixed, in one area cystic, mass. Below the nipple could be felt a second, smaller, round, elastic, freely movable lump. The axillary lymph nodes were enlarged, very firm and fixed to the surrounding tissue. On section of the breast and axillary lymph nodes the mass below the nipple was not cut. It proved to be easily removable from the surrounding tissue and was 3 cm. in diameter. The mass above the nipple was sectioned, measuring 7.5 x 5.5 cm. in diameter, and found to be in its lower part, grayish pink, fibrous, translucent and elastic; in its upper part gray, granular, firm and friable, losing itself in the surrounding tissue. The center of the mass was cystic. The axillary lymph nodes on section were gray, dry, granular, translucent

Fig. 6

Fibrocarcinoma of breast. Right half of breast and axillary lymph nodes on section. Below, a small, encapsulated, easily enucleated, round elastic fibro-adenoma. Above, the fibrocarcinoma with its fibro-adenomatous portion below and its fibrocarcinomatous portion above. Note the carcinoma filled axillary lymph nodes. Photograph.

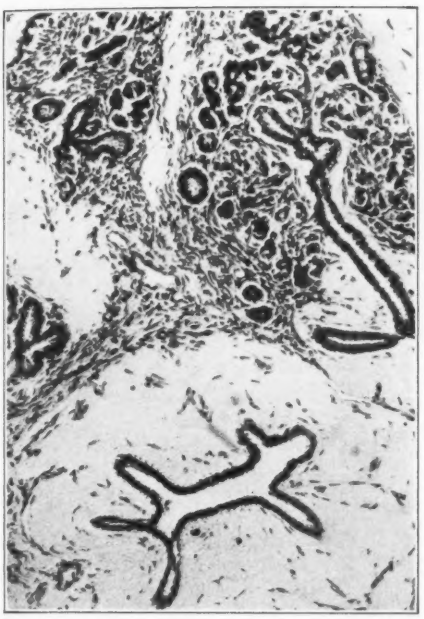

Fig. 7
Fibrocarcinoma of breast. Associated fibro-adenoma with its characteristic histology. Photomicrograph x200.

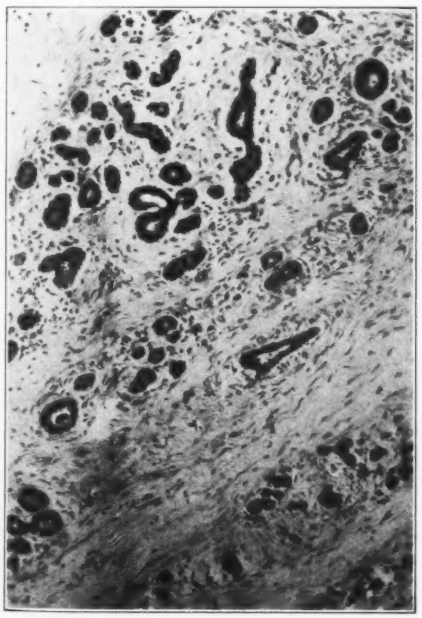

Fig. 8
Fibrocarcinoma of breast. Fibro-adenomatous portion showing characteristic structure. Photomicrograph x200.

and firm, the largest measuring 1.5 cm. in diameter (*Fig. 6*).

Microscopic Examination.—The small mass below the nipple had the typical histology of a benign fibro-adenoma (*Fig. 7*). The lower part of the larger mass above the nipple had a similar history (*Fig. 8*), while the upper part consisted of fibrous tissue, and solid cords and nests of aplastic, variously shaped, sized and stained, mitoses containing, epithelial cells with some attempt at gland pattern. Areas of necrosis were seen (*Fig. 9*). The axillary lymph nodes contained metastatic carcinoma similar in type to that in the larger mass (*Fig. 10*).

Anatomical Diagnosis.—Fibro-adenoma and fibrocarcinoma. The latter metastasized as an adenocarcinoma to the axillary lymph nodes.

In this case, of importance clinically was the presence of a mass in the breast for 18 months which had gradually become larger, associated with palpable axillary lymph nodes and a second benign mass in the same breast.

Of the 18 cases, including our case, the age, in the 7 cases where it was given, varied from 13 to 60 years, the average being 38.4 years. The duration of these tumors, when stated, ranged from one month to six years.

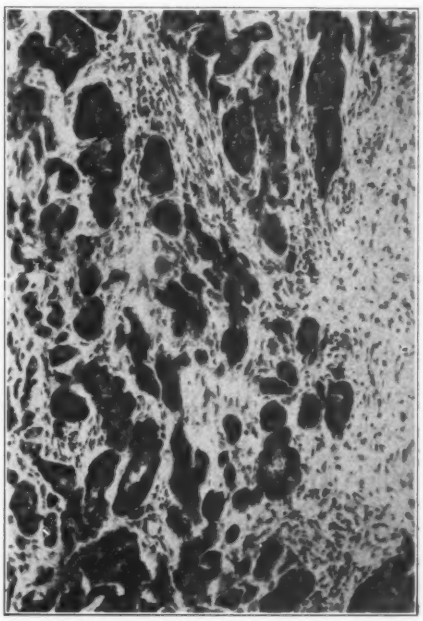

Fig. 9
Fibrocarcinoma of breast. Fibrocarcinomatous portion showing fibrous tissue, cords and nests of aplastic, mitoses containing, epithelial cells. Photomicrograph x200.

Fig. 10
Fibrocarcinoma of breast. Axillary lymph node showing metastatic adenocarcinoma. Photomicrograph x200.

SUMMARY AND CONCLUSION

The literature regarding adenofibromata of the breast which have undergone malignant metamorphosis revealed 29 cases which had undergone a sarcomatous change and 17 a carcinomatous change.

The usual clinical history of these cases was that of the discovery of a small mass in the breast which had remained stationary or grew very slowly, and after a variable length of time took on a rapidity of growth out of all proportion to the previous rate. However, the rate of growth was variable, so that in some of the cases the malignant change was found when least suspected.

The following two illustrative cases have been reported: (a) an adenofibroma of the breast which changed into an adenosarcoma, and (b) fibro-adenoma of the breast which changed into a fibrocarcinoma and metastasized as an adenocarcinoma to the axillary lymph nodes.*

*We are indebted for the photographs and photomicrographs of these cases to Mr. Joseph L. Scianni, artist, University of Tennessee, Pathological Institute.

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DISCUSSION (*Abstract*)

Dr. Charles Phillips, Temple, Tex.—For years I have looked for a case where I could actually trace the transition from an ordinary adenofibroma of the breast into a carcinoma. The authors have presented a clear picture of this condition, and I have been much interested in their development of the subject. Twenty years of active tissue work have not yielded for me a case like this.

Dr. Geo. R. Callender, San Antonio, Tex.—Dr. Lindsay and Dr. Schmeisser are to be congratulated on this very convincing presentation. It also demonstrates most clearly the necessity of studying sections cut from various parts of the breast, without which no pathological examination of this organ can be considered complete.

Dr. George S. Graham, Birmingham, Ala.—The authors have done well to bring to attention again the fact that not every adenofibroma is innocent. It is not always easy to differentiate histologically between the benign and the malignant forms. In different examples of the tumor there is wide variation in the cellularity and in the degree of cellular differentiation. One or the other element of the tumor may show such changes, though in my experience I have not seen them together. A certain amount of cellular irregularity and even a rare mitotic figure is possible to the benign tumor, but it may be difficult to draw the line between a mere hyperplasia and a true malignancy. I believe this to be true especially in those cases where there is obvious proliferation of the fibrous stroma. The problem was brought sharply to attention in a very recent case. Here a frozen section diagnosis of edematous adenofibroma was returned a little over five years ago on a biopsy specimen and confirmed from later paraffin sections. Simple removal of the tumor was performed.

Six months ago the woman returned with two small nodules in the old operative area. Frozen sections and paraffin sections now showed a pure fibroblastic tumor which was obviously malignant. Radical operation was performed. About two weeks ago the patient came to autopsy and metastatic fibrosarcoma was found in lung and brain. Here there was, I believe, the development of true malignancy in a tumor which was, so far as could be determined, originally benign.

VARIATIONS IN ORIGIN AND COURSE IN HEPATIC ARTERY*

IMPORTANCE FROM SURGICAL VIEWPOINT

By E. ZOLLICOFFER BROWNE, M.D.,
New Orleans, Louisiana

The death rate following gallbladder and bile duct surgery still remains high. Gelpi[1] found the rate to be 16.21 per cent in Charity Hospital of Louisiana in 1914-1915. Verbrycke,[2] of Garfield Memorial, found it to be 8.8 per cent in that institution in 1927. The average from the literature ranges between 5 and 10 per cent, varying in different hospitals and with individual operators. Many investigations have been made into the cause of this rather high rate, with a view of attempting its reduction.

The factors that enter into the causation of deaths following gallbladder surgery may be divided into three general classes:

(a) Errors of judgment

(b) Unavoidable accidents and complications

(c) Errors of technic

As to the first two, we readily see a great cause for mortality, since many cases are operated upon that should not have been, or operated upon at the wrong time, and though the operation was beautifully done the patient died. The surgeon reflecting, fears that he has made an error in lack of a thorough preoperative study of his patient, or of proper preoperative preparation, or possibly that he did too much exploring of other viscera while the patient was under the anesthetic and thereby brought on shock; possibly he should have used spinal anesthesia in this case instead of general, or general anesthesia instead of spinal, or should have supported the patient with more fluids after operation and pursued a slightly different postoperative method.

These postmortem reflections have passed through the minds of conscientious surgeons since operation was first performed upon this important viscus and should continue to do so as long as surgery is practiced, as self-examination is good for all and enlivens the conscience. However, important as this factor may be, it does not come in the scope of this paper.

I shall, therefore, pass to the third classification and confine my study to one of its phases that undoubtedly accounts for many cases of unexplained liver death, namely: injury to or accidental ligation of the hepatic artery, particularly the right hepatic branch, while tying off, or attempting to tie off, the cystic artery and cystic duct during cholecystectomy, or in opening the common bile duct in the supraduodenal method of choledochotomy. This accident is due in a great measure to the surgeon's coming across one of the frequent abnormalities or variations in the course of this important vessel, especially when his field is obscured with many dense adhesions.

In dealing with the hepatic artery, the following rather commonly accepted designations will be used for its different portions:

(a) Common hepatic artery, from its origin at the celiac axis to the point where it gives off its gastroduodenal branch.

(b) Hepatic artery proper, from the point where the first branch is given off until it divides into its terminal branches, this usually being at the upper portion of the lesser omentum, near the portal fissure of the liver and to the left of the common hepatic bile duct.

(c) The two terminal branches, the right and left hepatic arteries. The right branch supplies arterial blood to the right lobe and usually is the source of origin of the cystic artery.

Judd[3] lists the two major complications of cholecystectomy as injury to the common bile duct and hemorrhage from unsuccessful ligation of the cystic artery. These quite often go together, as it sometimes happens that the cystic duct is securely grasped, without catching the artery, and when the tissues are divided the artery quickly retracts and bleeds freely. Hurried attempts to catch the artery with rat-tooth forceps may result in serious injury to the great duct or ligation of the large right hepatic artery. This would be exaggerated by a cystic artery arising on the left side of the common bile duct, or a right hepatic artery coursing parallel to the cystic duct.

Graham and Connell[4] reported a case of accidental ligation of the hepatic artery and re-

*Received for publication April 2, 1935.

*From the Department of Anatomy of Tulane Medical School.

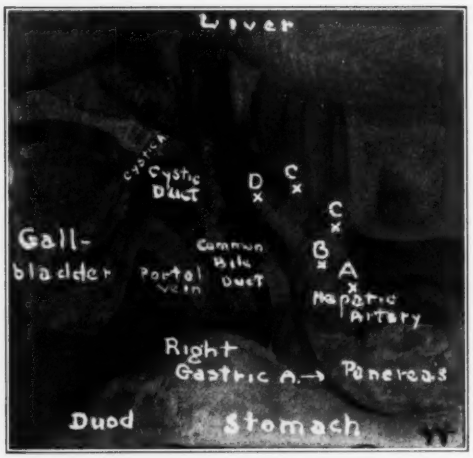

Fig. 1

Points of ligation: A, usually attended with little hepatic necrosis; B, also attended with little hepatic necrosis; C and D, attended with severe or total necrosis of portion of liver supplied.

viewed the literature on the subject to date, stating that twenty-seven cases of this accident had been reported. Of course, we all know that many such cases are not reported. The artery was divided, in this case, at the upper border of the pylorus, before any branches were given off. The patient's condition grew suddenly worse on the fourth day and death occurred on the seventh day. Autopsy of this patient revealed only moderate necrosis of the liver and an extensive bronchopneumonia. So it was concluded by the authors that the patient might have lived if it had not been for the pneumonia. The reason for this conclusion is supported by Ritter[5] in an excellent review of the subject. He divides the cases of ligation of the hepatic artery into five groups, with the mortality varying widely according to place of litigation (*Fig. 1*).

(a) Those cases showing ligation of common hepatic artery.

(b) Those cases showing ligation of hepatic artery proper before the right gastric branch has been given off.

(c) Ligation of right hepatic branch.

(d) Ligation of left hepatic branch.

(e) Undetermined point of ligation.

He concludes his study with the following observations:

(1) Ligation of common hepatic artery can be undertaken without much fear of hepatic necrosis, strange as this may seem. (This is because of the various anastomoses of the branches of the celiac artery.)

(2) Ligation of the hepatic artery proper, before the right gastric branch is given off, was also found by Ritter[5] to produce little ill effects.

(3) Ligation beyond this point, that is, to either the right or left terminal branches, is attended generally with total or severe necrosis of the portion of the liver supplied. In other words, the prospect for liver necrosis increases steadily as the point of ligation moves nearer the liver (*Fig. 1* shows points of ligation).

McIndoe and Counsellor[6] demonstrated, by means of the celloidin-corrosion method, that the area of distribution of the right and left branches of the portal vein in the human liver is sharply divided along a line from the fossa for the gallbladder to the entrance of the hepatic veins into the inferior vena cava, and that the only communication between the two vessels is through intercellular sinusoids. They also found that the same line of demarcation rather sharply separated the field of supply of the branches of the right and left hepatic artery, there being only a slight overlapping. The line of lobar separation, as determined by the celloidin method, corresponds to the recognized embryologic boundary between the right and left lobes of the liver. Thus, if the right hepatic artery is ligated, there is small hope that a collateral anastomosis will be set up adequately from the vessels in the left lobe.

In my work as Instructor in Anatomy at Tulane Medical School I have from year to year been impressed with the number of abnormalities in the origin and course of the right hepatic artery and the cystic artery, as I have seen the

Fig. 2

This specimen shows a near approach to that described as normal.

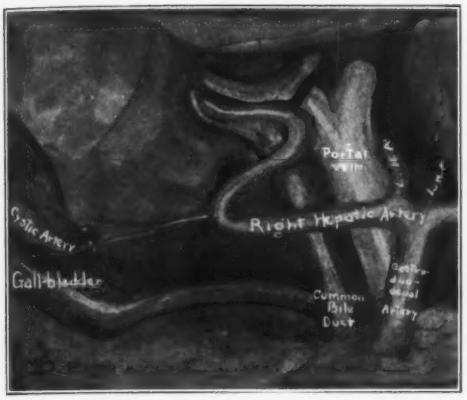

Fig. 3

This specimen shows a tortuous right hepatic artery coursing in front of the common hepatic duct, giving off the cystic artery at the right extremity of the hump. This is the hump so well described by Moynihan as "the hump on the back of a moving caterpillar." On first being found it extended down in front of the cystic duct. It was displaced upward during dissection.

root structures of the liver dissected out by the students in their work.

This year during the course of the two anatomy trimesters, we had about sixty-six cadavers in the laboratory and I again noticed some unusual arrangement of the root structures. Of the sixty-six cadavers, six were in such poor state of preservation that they were discarded as far as this study was concerned. Of the sixty, the hepatic artery and branches in nineteen, or approximately one-third of the lot, were of such character as to be considered definite variations from normal. Misses Walton and Buchanan, students in the class, kindly sketched them for me, and I am using them in this paper as illustrations. Especial attention was paid to the right hepatic and cystic arteries, although other variations were also noted. There was sketched one subject that is the so-called normal (*Fig. 2*).

Textbooks on anatomy tell us that the hepatic artery proper passes upward in the right end of the lesser omentum, having the common bile duct and the lower portion of the common hepatic duct to the right and the portal vein posteriorly and also somewhat to the right, and that, near the portal fissure it divides into its terminal branches, the right and left hepatics. The right hepatic branch is then described as passing upward and to the right, behind the common hepatic duct and lying in the moderately acute angle formed by the union of the cystic bile duct with the common hepatic duct, but its course is well away from the long axis of the cystic duct. It gives off the cystic artery on entering this angle. The cystic artery then travels downward and forward in the acute angle formed by the two bile ducts to the neck of the gallbladder. In its course through the angle it somewhat parallels the cystic duct, but lies a little above and to the left of it.

Flint,[7] after a study of 200 cases, however, says that only 69 corresponded to this usual textbook description. Approximately 70 per cent of his cases, then, varied from the so-called normal, which is considerably more than my 19 out of 60. May it be said here, however, that this investigator's percentages run rather uniformly higher than others. From the work of Flint,[7] Rio Branco,[8] Des Comps,[9] Ruge,[10] Kunze,[11] Eisendrath,[12] Friend,[13] and Thompson,[14] the following percentages of abnormalities have been compiled, and my estimates are given for comparison:

(a) In 12 per cent of cases the right hepatic artery crosses the front of the common hepatic duct or even the ductus choledochus, the latter condition presenting difficulty for the surgeons in supraduodenal choledochotomy (Kümmel's

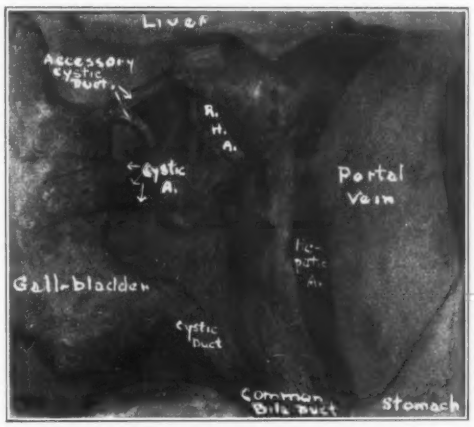

Fig. 4

This specimen also shows a rare condition, an accessory cystic duct, running from the right hepatic duct to the gallbladder and an accessory right hepatic duct coming from the right lobe of the liver and joining the common hepatic duct. The right hepatic artery lies first behind, then above and then in front of this accessory right hepatic duct. It gives off three short cystic branches while it lies in front of this duct. Danger here to both the right hepatic artery and accessory right hepatic duct.

The hepatic artery in this case is a branch of the superior mesenteric and passes behind the portal vein and common hepatic duct.

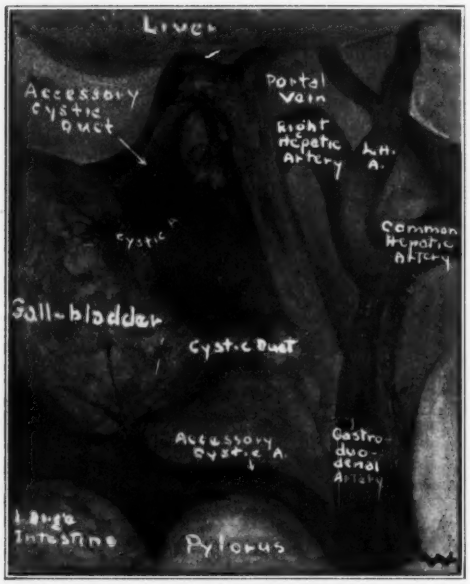

Fig. 5

This rare specimen shows two cystic arteries, one arising from the gastroduodenal artery and passing below the level of the cystic duct, the other arising from the right hepatic artery and running at a considerably higher level than the cystic duct. Also shows an accessory cystic bile duct, arising from the right hepatic duct.

operation). In my series there are nine cases showing this, a percentage of 15.

(b) In 10 per cent the right hepatic artery runs parallel with and very close to the cystic duct and neck of the gallbladder, almost suggesting a double cystic duct. I found this condition in 13.5 per cent.

(c) In 8 per cent the right hepatic artery forms a loop in front of the common hepatic duct, the right extremity of this loop forming a hump, which Moynihan compares to a hump on the back of a moving caterpillar, that even extends in front of the cystic duct. This condition was found in my series in about 12 per cent of cases (*Fig. 3*).

(d) In 21 per cent of cases the right hepatic artery (Flint[8]) arises from the superior mesenteric artery and always passes behind the common bile duct and often the portal vein. His findings in this variation are much higher than other investigators. Thompson,[14] for instance, whose recent work is very thorough, found this in 12 per cent. My series shows it in only 5 per cent (*Fig. 4*).

(e) In 10 to 12 per cent of cases there is an accessory cystic artery, the two cystic arteries in most cases coming from different sources and offering great possibilities of excessive hemorrhage in cholecystectomy. My specimens show this definitely in 6 per cent. In one case (No. 5) one of the cystic arteries arises from the right hepatic and the other from the gastroduodenal artery. Eisendrath[12] considers this the most interesting surgically of the anomalous origins of the cystic artery (*Fig. 5*).

(f) More than two cystic arteries are rarely found. Brewer[15] has one case on record showing three. My *Fig. 4* shows this condition, there being three in this case, all three springing from the right hepatic artery. This case, together with Brewer's, makes 2 cases in about 1,100 specimens, about 0.2 per cent.

(g) The relationship of the cystic artery to the common and hepatic bile ducts is interesting and important. From a study of various authors it has been found that the cystic artery passes ventral to the common hepatic duct in 15 per cent and ventral to the ductus choledochus in about 2 per cent. My percentages were 20 and 1.5 per cent, respectively.

SUMMARY

An inquiry has been made into the causes of the rather high mortality rate following gallbladder surgery with an attempt to further its reduction.

Attention has been called to the frequent variations in the hepatic artery, particularly the right hepatic and cystic branches, as one of the possible causes of mortality, in hopes that a knowledge of these variations may be always in the surgeon's mind. To be forewarned is to be forearmed.

Sixty cadavers were studied and variations noted in nineteen, or approximately one-third. The percentages of some of the most common variations of right hepatic and cystic arteries were computed and compared with those of other investigators. The specimens were studied and the drawings made before the literature was studied. Thus no effort was made to force percentages of any one variation to conform with those of other investigators.

It is the purpose of the essayist to make this study the first in a series, hoping thus to obtain more information on this important subject.

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THE NEUROPATHOLOGY OF PELLAGRA IN ITS RELATION TO THE CUTANEOUS AND OTHER MANIFESTATIONS*

A PRELIMINARY REPORT

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The story of pellagra is a long one and one which, in spite of the widely accepted vitamin deficiency theory as to its etiology and treatment, is still unfinished.

The question of the incidence of pellagra during 1927, 1928 and 1929, the "fat" years of prosperity, as compared with those in 1930, 1931 and 1932, the "lean" years of depression, showed that in the registration area there occurred 18,083 deaths during the "fat" years and 15,118 during the "lean" years. Some have considered that during the "lean" years the farmers reduced their crops and raised better gardens, but this does not seem tenable, because they not only had less money with which to buy food, but over a good portion of this area severe droughts occurred for two summers. Another question which arises is this: are the manifestations of pellagra due to the effect of specific food deficiency similar, for instance, to that which occurs in scurvy and in rickets, or are these manifestations due to some toxin or virus affecting the nervous system similar, for instance, to multiple sclerosis or to acute anterior poliomyelitis?

In the present work an attempt will be made, first, through an examination of the literature and of the autopsy material of pellagrins herein reported, to correlate the alimentary and cutaneous lesions with the pathological lesions found in the nervous system; next, to examine the neuropathology found, and third to suggest a virus invasion as the possible etiological factor.

The Alimentary and Cutaneous Lesions.—The writer[1] showed in 1911 that the sequence of the symptoms of pellagra was first those of the alimentary canal, then of the cutaneous surfaces; nervous and mental manifestations usually coming later. In the alimentary canal the parts

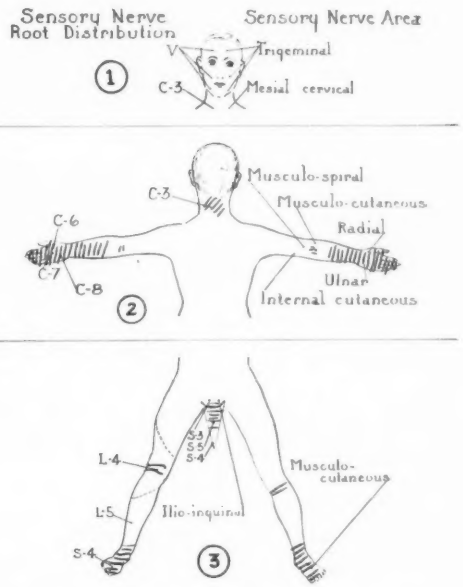

Fig. 1.—Distribution of cutaneous lesions in pellagra occurs in the peripheral distribution of the trigeminal nerve and the third cervical root. Stomatitis is also probably due to trigeminal affection.

Fig. 2.—Distribution of cutaneous lesions in pellagra occurs in the peripheral end-area of the third, sixth, seventh and eighth roots. Shaded areas show cutaneous areas affected by pellagra.

Fig. 3.—Distribution of cutaneous lesions in pellagra occurs in the area of the fourth and fifth lumbar and the third, fourth and fifth sacral. Shaded areas show cutaneous areas affected by pellagra.

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†I am indebted to Dr. Frank Apperly, Professor of Pathology of the Medical College of Virginia, for an autopsy supplying a cord and the sympathetic ganglia in one case, and to Dr. E. H. Ingersoll, Department of Anatomy of the Medical College of Virginia, for his work in preparing and staining the slides for this paper and his aid in the pathological interpretation of these slides. I am also indebted to Dr. H. C. Henry, of the Central State Hospital, Petersburg, Virginia, for two brains and cords of pellagrins and to Dr. J. R. Gill for detailed clinical histories of these cases; to Dr. J. H. Pound, of Chattahoochee, Florida, for two brains and cords; also to Dr. Walter Freeman for two cords of pellagrins and a cord of a case of ascending central neuritis for comparison. I also wish to thank the health officers of Virginia, North and South Carolina, Georgia, Alabama, Florida, Mississippi and Louisiana and Dr. Francis Wheeler and Dr. W. H. Sebrell, of the United States Public Health Service, for certain statistics on the incidence and mortality of pellagra.

Fig. 4.—Pellagra showing lesions in trigeminal region and on hands.*
Fig. 5.—Pellagra, lesions on dorsum of hands
Fig. 6.—Pellagra, lesion on dorsum of foot.

*J.A.M.A., **56**:246-251, Jan. 28, 1911.

chiefly affected by pellagra are the mouth and the colon. Denton,[2] in the autopsy of twelve cases observed, stated that there were "no important or consistent lesions found in the stomach or small intestine," but said that "the changes in the colon are remarkably constant and all but specific." Thacker[3] found inflammation of the intestines practically limited to the colon.

The cutaneous lesions are bilateral and symmetrical and occur chiefly on the dorsum of the hands and the extensor surface of the arms, on the outer surface of the elbows, on the dorsum of the feet and the front of the knees, on the forehead, ala nasae, cheeks and chin, and less frequently on the front and back of the neck and on the labia or scrotum. Hence, these lesions occur on either exposed or unexposed surfaces. In 1916, I[4] stated that the cutaneous lesions of pellagra corresponded to the distal part of the cutaneous area of distribution of certain posterior nerve roots. In comparing *Figs. 1, 2* and *3* with *Figs. 4, 5* and *6* an idea of the correspondence of the cutaneous lesions with the end distribution of the posterior nerve roots may be noted.

Certain neurological manifestations of pellagra lesions may also be mentioned. In 1912, I[5] reported the neurological findings of eighty-eight cases of pellagra. Among the organic neurological symptoms were tremors 53 per cent, muscular cramps 50 per cent, transient contraction of the limbs 5 per cent, mumbling speech 40 per cent, diminished hearing 15 per cent, diminished smell 23 per cent, diminished taste 50 per cent; Romberg sign was present in 57 per cent of 55 cases tested. Ataxia was not infrequently observed, but not numerically listed. The knee jerks were present in 88 per cent of 74 cases tested, they were exaggerated in 62 per cent, decreased in 9 per cent and absent in a little over 10 per cent. Ankle clonus, Babinski and other pyramidal tract signs were rare. The pupils were contracted in 20 per cent, dilated in 25 per cent, and unequal in only two cases. The pupillary reaction to light was sluggish in 11 per cent and absent in 6 per cent. Paralysis occurred in six cases, three paraplegia, one hemiplegia, one monoplegia, and one sphincter ani. The mental symptoms of pellagra do not correspond to any clinical mental entity. They are chiefly those of the delirious order seen in cerebral toxemia.

Considering the pathological lesions of the nervous system, Mott[6] found scattered degeneration throughout the white matter of the cord, more marked in the postero-lateral and postero-median columns of the cord, with chromatolysis of the posterior ganglia and swelling. Harris[7] found changes in the cord in which the pyramidal cells suffered most. He also noticed changes in the spinal sympathetic ganglion. Langworthy[8] said there was no basis for the conjecture that injury to the autonomic cells could be held responsible for cutaneous or gastro-intestinal symptoms, but he based this statement on the study of one autopsy. He reported thinning of the myelin sheath of the nerves and he thought the lateral columns bore the brunt of the cord degeneration.

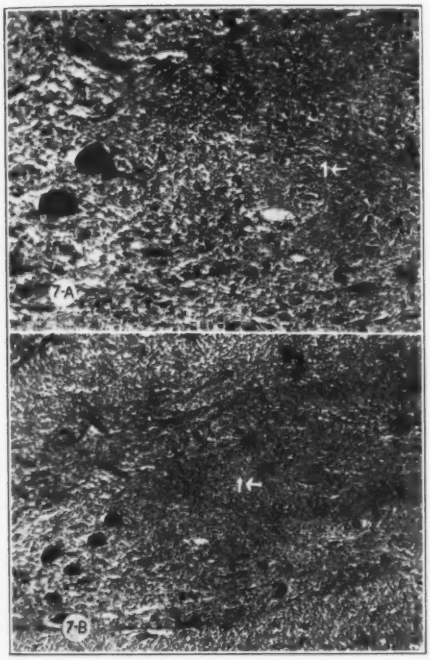

Fig. 7-A.—Section, high power, from seventh cervical segment, posterior column, showing gliosis (1 arrow) and degenerated cells.

Fig. 7-B.—Section, low power, from seventh cervical segment, posterior column, showing gliosis (1 arrow) and degenerated cells.

In the study of two cords, Anderson and Spiller[9] concluded that pellagra does not produce a systemic disease of the central nervous system. Spiller thought the degeneration was caused by some toxic or infectious substance, affecting all parts of the cerebrospinal axis, producing cellular degeneration and diffuse degeneration of the nerves in the posterior and antero-lateral columns of the cord. Others have reported changes in Clarke's columns and Lissauer's tract.

Pathological cerebral changes have not been marked. Denton[10] found no thickening of the meninges. In acute cases he found no proliferation of the glia and only slight proliferation in the chronic cases; some cell degeneration was found in the cortex of the brain and isolated cell changes were found in the pons, medulla and basal ganglia. Harris[11] found some sclerotic changes in the medulla and the cortex. Singer and Pollock[12] reported thickening of the meninges. There were no striking findings noted in a review of the literature of brain pathology in pellagra.*

Our present study shows examination of the cord in six cases as follows:

The six spinal cords and two ganglionic chains were transferred at autopsy to a 5 per cent formaldehyde solution and later fixed, sectioned and stained with hematoxylin and eosin. The most constant finding in the cords and in the sympathetic spinal ganglia was gliosis. In the cords the posterior columns were especially involved. This finding is well seen in *Figs. 7-A* and *7-B*, showing a section of the cervical portion of the cord, posterior columns. Other find-

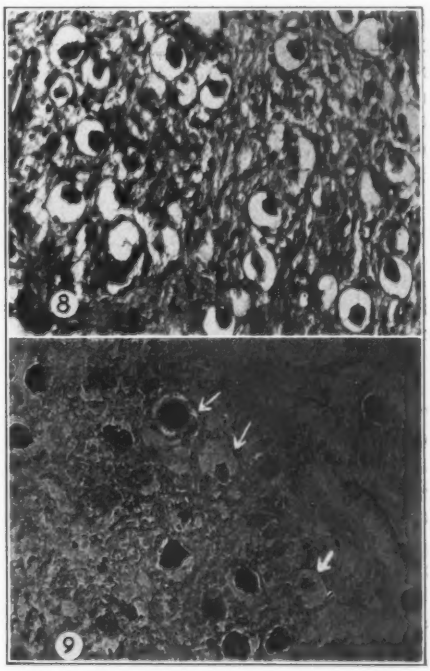

Fig. 8.—Spinal sympathetic ganglion showing marked degeneration of cells. This patient had pellagra and also pulmonary tuberculosis.

Fig. 9.—Spinal sympathetic ganglion showing cell degeneration (some of the cells marked by arrow) in an uncomplicated case of pellagra.

*My attention has just been called to a paper by Harris. In this work pellagra tissues were made into Berkefeld filtrate and injected subcutaneously, intravenously and intracranially into three monkeys, all of whom developed lesions similar to pellagra. This paper escaped my previous attention, but seems to be strong experimental evidence of probable filtrable virus invasion in cases of pellagra.

Harris, William H.: The Experimental Production of Pellagra in the Monkey. J.A.M.A., **60**:1948-50, June 21, 1913.

ings in both cords and ganglia were scattered chromatolysis, shrinkage of nerve cells, pigmentation, neurophagia and lysis of Nissl granules or fragmentation of the same. Allowing for possible postmortem changes it would seem that these changes occur more markedly in pellagra than in most other diseases, although they cannot be considered specific for pellagra. The impression of the examiner is that all forms of degeneration were possibly more marked in the cervical and lumbar regions of the cords, but a positive statement as to this cannot be ventured. The degenerations of the spinal sympathetic ganglia were extensive, as may be noted by *Figs. 8* and *9*.

Can virus invasion be the etiological factor? At present this factor can only be suggested. The disease in its wide epidemiology, in its place occurrence, in its trophic lesions corresponding to root endings, in its cord and spinal sympathetic ganglia invasion, in its apparent attenuation and in its recurrence reminds one of such filterable virus diseases as influenza, encephalitis and infantile paralysis. In our studies and in previous studies of the nervous system, I believe that much yet is left to be desired. Many more sections of the cord from the upper cervical region to the conus should be studied; but little work has been done on the study of the sympathetic ganglia and there is room for more intensive study. Both motor and sensory peripheral nerves and sympathetic nerves should also be further studied. I believe if this is done pellagra will eventually be classified as a neurological rather than a general medical disease and that it will be found that the distribution of the cutaneous and alimentary symptoms will be in relation to the lesions of the nervous system.

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HEREDITARY ECTODERMAL DYSPLASIA OF THE ANHIDROTIC TYPE WITH REPORT OF TWO CASES*

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There is a certain group of individuals who, because of a developmental defect, find it necessary to hibernate, so to speak, during the summer rather than during the winter months; or, if not hibernating, they take on the habits of the turtle, as described by Bowen.[1] The children to be reported found it necessary this summer to spend a greater part of the day immersed in water, especially since the mean temperature was considerably above average. One of them even learned to take his naps in a tub of water.

Weech,[2] in 1929, gave this condition the name of hereditary ectodermal dysplasia of the anhidrotic type, although it was first described and reported by Thurman[3] in England in 1848. He described a man 58 years of age who had never perspired or shed tears, who had only 4 upper teeth, absence of hair and a delicate skin. He also reports autopsy findings on this case, and there were no further autopsies done on any reported case until 1931, at which time one was reported by Zelig.[4] Following Thurman, 16 cases were reported in the literature from various parts of the world under different diagnostic or descriptive terms; but it remained for Weech to give the condition its present descriptive name, at which time he reported two more cases.

The cardinal symptoms of this condition, as its name implies, are its hereditary tendency. The defects are developmental anomalies involving structures having ectodermal origin; and they are unable to perspire.

The structures having ectodermal origin are the following: the skin, together with the sweat glands and the sebaceous glands, the nails, hair, teeth, the external organs of special sense, the nervous system, the mucous membrane of the mouth, nose and anus. Most of these structures, also, are involved in the condition being described.

The typical symptoms and signs are described by MacKee and Andrews[5] as congenital ectodermal defects. They reported congenital ab-

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sence of sweat glands, absence of pilosebaceous apparatus over most of the body, marked dental aplasia, depressed nasal bridge, atrophic rhinitis, prominent supraorbital ridges, thick protrusive lips, thin, glossy, smooth, dry skin, papular lesions on the face and heat intolerance.

Case 1.—V. W., a white boy, born August 25, 1927, was first seen in April, 1934. I was called by an associated orthopedist to whom he had been referred for plastic work on his nose.

The boy's father was living and well. He gave no history of a similar disturbance or any ectodermal defect.

His mother was living and well. Her upper permanent canine teeth were absent. A maternal aunt had not all of her teeth; she had asymmetry of the face, said to have been due to treatment for pneumonia, the type of treatment not known by the mother; and her hair also was dry. All the uncles were well and there were 11 children in the family. The mother's two other sisters had each 2 normal children.

The patient had one sister 12 years old living and well, perfectly normal. Three brothers were similarly affected and all died with influenza within 3 days at 2 years, 3 years, and 4 months. They never perspired and the two older boys had only two teeth each. One other brother, the first child, was normal, but died at 12 years with encephalitis.

The patient's birth weight was 6 pounds, labor was normal, he was "skinny and wrinkled" at birth. He had pneumonia at 3 months and at 4 years, and was sick for 2 months, the last time in a hospital in South Dakota. He had had varicella and pink eye. His Wassermann was negative. Tears flowed freely.

His weight was 44 pounds, height 45 inches. He was a slightly underweight boy of 7 years. His head was negative except for sparse dry hair; his ears were negative. He had a saddle nose with foul discharge and nasal obstruction. There were prominent supraorbital ridges. The eyebrows were apparently absent or extremely fine. He had prominent protruding lips, four upper teeth, peg shaped, widely spaced, and no lowers. The lower part of the face was underdeveloped. The skin was dry and smooth and there was no sensible perspiration. His heart and lungs were negative. Both nipples were present. The genitals were negative, of average development. The palms and soles were extremely dry, roughened and fissured. The nails were normal. The reflexes and mentality were normal. During the previous summer it was necessary for him to spend the greater part of the day in the water. He even slept in the water at times. Between his first visit in April and September he made a gain of 1¼ pounds in weight and ¾ inch in height.

Case 2.—O. W. P., Jr., a white boy, born August 23, 1929, was first seen on September 4, 1929. He was referred by his physician because of high fever with a possible diagnosis of cerebral birth injury and interference with heat regulating centers.

His family history was negative. His father and mother were both living and well. One brother and two sisters were living and well. No similar disturbances or defects were known in the family. He was of German descent on both sides of the family.

He had been born by normal rapid labor and was apparently normal at birth. After the first day he began to have fever each afternoon, which left at about midnight. He nursed well and had frequent bowel movements. He slept well when his temperature was down; was irritable when feverish.

Examination at this time revealed a dehydrated boy baby 2½ weeks of age, weight 7 pounds 2½ ounces. He was fretful on examination, but became quieter after nursing freely in the office. His temperature was 102° F., his skin dry, scaly, reddened and there was an impetiginous rash over the scalp. His head was negative, the anterior fontanelle was large and fairly tense. His

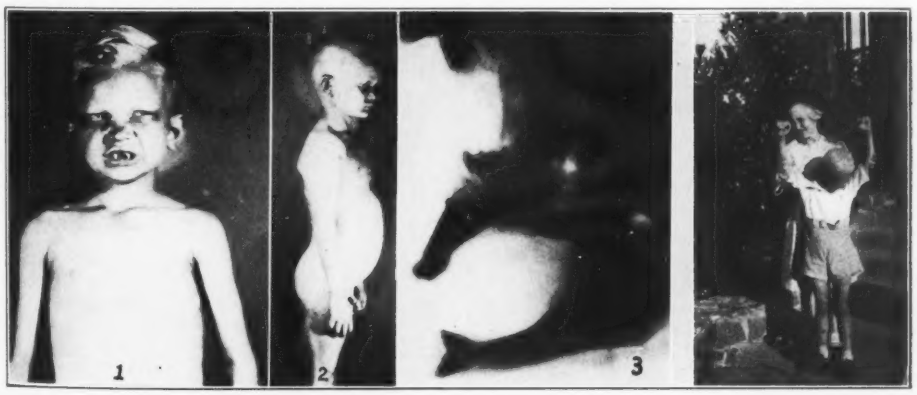

Fig. 1, Case 1.—Tooth defect being illustrated.
Fig. 2, Case 1.—Illustrating sparse hair, saddle nose, prominent lips and dry skin.
Fig. 3, Case 1.—V. W. X-ray illustrating absent teeth.
Fig. 4, Case 2.—O. W. P., Jr. Illustrating sparse hair and dry skin.

pharynx was red, as was the entire buccal mucous membrane. His ears were negative, nose negative, eyes negative except for a slight infection of the conjunctiva and some lacrimation. His heart and lungs were negative, his abdomen was negative, there was no enlargement of spleen or liver. Phimosis was present. The reflexes were normal. There was no spasticity. This was considered at the time as a simple case of inanition fever with possibly slight pharyngitis. Following this visit the baby gained well, the scalp infection cleared under a weak ammoniated mercury and phenol ointment, but the temperature remained elevated unless the patient was given antipyretics, and the skin remained dry with no perspiration. The tears at this time seemed to cause excoriation of the skin beneath the eyes; and after the middle of October the temperature remained normal. At this time small doses of thyroid were ordered. The following spring he was seen again, having spent a very satisfactory winter, but on the onset of warm weather the temperature rose again, and at this time it was noted that his nails were dry, flat and turned up at the edges, and the ends were concave rather than convex. At 8 months of age his first lower incisor teeth erupted and at 14 months he was walking well, seemed alert, had 4 teeth and his weight was 20 pounds. His Wassermann was negative and other examinations were negative, although the dry skin persisted and he had had fever all summer. He was not seen again until September 29, 1934, at which time he weighed 37 pounds and his height was 43 inches. He had had pertussis, measles and varicella, all of which were mild. Each summer he had high fever and spent the greater part of the time in a tub of water. He was resistant to examination and shy, and his mother reported possibly less initiative than his brothers and sisters. His mother felt this was due to the fact that his sisters had catered to his wants because of his condition. Examination at this time revealed his skin very dry, harsh and pigmented; the palms and soles especially were rough and fissured. All of his teeth had erupted, but were becoming carious. The hair was sparse, extremely fine and dry. There was no saddle nose or prominent supraorbital ridge, the lips were normal, except for a Perleche at each corner of the mouth. All mucous membranes were reddened. Genitals were normal. Both toe nails and finger nails were concave with broken tips. There was no evidence of perspiration or moisture.

Goeckerman,[6] MacKee and Andrews and Weech, in their masterful and exhaustive summaries, covered this condition from all angles, making it unnecessary to go into detail further than to present salient characteristics and review more recent literature. Their work has stimulated considerable interest and since that time cases have been reported regularly in American and foreign literature.

Kerley[7] reported one case in a male infant of one year. Jean Smith[8] has reported two cases in brothers, one and six years of age. Bowen reported one case in a male of five years and made reference to several others. Gordon and Jamieson[9] reviewed the literature prior to 1931 and reported a case in a female of 17 years, which is the fourth female reported. Zelig, in 1931, reported another male infant of one year on whom a complete autopsy was performed, the second recorded autopsy.

Clouston,[10] in 1929, reports a series of 119 cases of a hereditary dystrophy of hair and nails occurring in six generations of the same French-Canadian family. He gives this condition the name of hereditary ectodermal dystrophy. One branch of the family has also been reported by Jacobsen.[11] They differ from the anhidrotic type being reported, in that they usually possess active sweat glands, they may have good teeth or again their teeth may be defective, and they do not have "saddle nose;" their hair "wears poorly" and their nails show varying degrees of dystrophy present, both the toe nails and the finger nails.

Certain characteristics that prevail in some of these cases, but not in all, are listed.

The mammary glands, which are in fact just modified sweat glands, may or may not be present. My two cases both had nipples, although one of Ascher's[12] cases and those of Tendlau[13] and Hutchinson's[14] were reported with absent nipples.

Poor definition of the vermillion border of the lips was reported in some of these cases, but not in all.

The mucous membrane of the nose and mouth is usually classified as atrophic, but MacKee and Andrews failed to observe this condition in their case. The atrophic rhinitis with its foul discharge and nasal obstruction is a fairly constant feature, and the mothers frequently report "snuffles" as present from birth in some cases.

The nervous system and external organs of special sense, both of which are of ectodermal origin, are seldom involved any more often than is seen in the average individual. Some report abnormalities in the appearance of the external ears, being lobeless and being attached to the head at irregular angles. Most of these cases are mentally alert and are up to the average in their scholastic work, although their facial expressions may make them appear subnormal.

Certain features are present which have no definite ectodermal origin, namely: the saddle nose, the prominent supraorbital ridges, and the prominent lips. The saddle nose usually develops after several years and is not noticed in the new born, which coincides with the impression that the defect follows the atrophic rhinitis. The prominent suparorbital ridges are more dif-

ficult to explain; although the prominent lips may be apparently due to the absence of teeth, bringing the alveolar borders of the jaws closer together, or it may be due to the hypertrophy of the muscles following the necessity for more grasping of food with the lips because of the dental aplasia.

The etiology is undetermined. There appears to be a definite hereditary background. Syphilis and tuberculosis have been considered, but apparently every case has had negative findings. No positive endocrinopathy has been found, although many cases have been given thyroid extract because of the condition of the hair, nails and skin.

No treatment has been suggested by any of the reviewers other than to avoid excessive heat during the summer months. Glandular therapy has been of no avail. Antiluetic treatment has been used on the earlier cases reported, but with no success. Dental prosthesis should be employed where possible. The individual should be advised of the possibility of hereditary transmission.

SUMMARY

(1) Two cases of hereditary ectodermal dysplasia of the anhidrotic type are reported.

(2) The literature is reviewed to date.

(3) The symptoms of the condition are grouped and their variations from hereditary ectodermal dystrophy are discussed.

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DISCUSSION (*Abstract*)

Dr. Tom Mitchell, Memphis, Tenn.—Congenital absence or defects of some of the tissues of ectodermal origin are not uncommon. From the ectoderm come the epidermis, nails, hair, teeth, glands of the skin, the eye, the ear, the nervous system, and the mucous membrane of the mouth, nose and anus. This particular entity, however, is rare and presents almost uniformly a picture involving, in a measure at least, all of these structures.

Also, in occasional cases recorded in the literature, structures not of ectodermal origin are involved, as a thickened cranium or a prominent supraorbital ridge.

This latter observation has led some to believe that the primary deficiency may be not in the ectoderm, but in some mechanism which may control the origin and development of these ectodermal organs.

The early writers eliminated syphilis, constitutional disease and chemical injury during fetal life as causative factors. The more recent ones search for some disturbance of the endocrine system. Weech, for example, finding in his first case a small sella, and in others an enlarged thyroid on physical examination, compares the peculiar development of the hair and the lessened secretion of the sweat and sebaceous glands in cretinism to the similar result, in part at least, in these ectodermal dysplasias.

Jacobsen particularly has studied the influence of heredity and finds that definite laws seem to govern the incidence of this condition in certain families which are quite the same as those accounting for the occurrence of color blindness and hemophilia, namely: that the females hand the defect down to their male offspring.

From the records of these observations on the glands of internal secretion on the one hand, and on the effects of heredity on the other, it occurs to me that probably the endocrines of the mother may have an influence on the development of these fetal structures and that perhaps in this condition a study of these women might clarify somewhat the indefinite etiology of this condition.

SEA SPONGE DRESSING TO PROMOTE HEALING AND ARM FUNCTION FOLLOWING RADICAL BREAST AMPUTATION*

By MERVIN J. RUMOLD, M.D.,
and
THOMAS G. ORR, M.D.,
Kansas City, Kansas

The disability most frequently associated with radical breast amputation is the limitation of abduction of the arm on the affected side. The cause of this disability is due chiefly to the formation of scar tissue following removal of the axillary contents.

To decrease scarring in the axilla the incision is placed medial to the anterior axillary fold. This makes a wide posterior skin flap which may

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*Department of Surgery, University of Kansas School of Medicine.

be moulded to fit the axilla after removal of the axillary contents. A stab wound for drainage through the posterior margin of the flap aids in preventing the accumulation of blood and serum.

After closing the skin a thin gauze dressing is applied over the wound and entire axillary area. Over this is placed one or two large sterile moist sea sponges, pressed firmly into place so that the skin flap will be moulded and held in contact with all axillary surfaces. Over the sea sponges are placed several layers of gauze and the entire dressing is held in place by three or four adhesive straps. A snugly fitted breast binder adds firmness and security to the dressing (*Fig. 1*).

Fig. 1

Sea sponges are moulded to the axillary space to be held firmly by adhesive straps and breast binder. The arm is held in abduction by a hand towel pinned to the mattress beside the pillow.

The dressing may be changed as frequently as necessary. The sea sponges, when dry, form an exact mould of the axilla and may be replaced in their original position.

The arm on the affected side is held at right angles to the body by a folded hand towel pinned to the mattress as shown in the illustration. With this dressing the forearm is left free for movement. The patient is usually most comfortable with the bed back rest raised to about thirty degrees. After the first twenty-four hours the arm may be freed for short intervals each day to rest the patient. After the fourth day limited shoulder exercises are advisable and after ten days the towel support may be discontinued with instructions that shoulder and arm exercises are to be taken faithfully to prevent adduction deformity.

The dressing here described has been used with success during the past two years in the surgical clinic of the University of Kansas Hospital.

RINGWORM OF THE SCALP*

TREATMENT OF MICROSPORON INFECTIONS WITH A SPECIFIC CULTURE FILTRATE

By LESLIE M. SMITH, M.D.,
El Paso, Texas

For a number of years epilation by means of the x-ray has been the treatment of choice for ringworm of the scalp in most clinics, regardless of the causative organism. Although this treatment can be safely given, there are so many chances for error in technic, and the consequences of error are so unpleasant, that any method of treatment which is curative in a reasonably short time without resort to the x-ray should be a welcome addition to our therapy. From time to time there have been reports of good results from various other methods in certain types of tinea capitis. It is well known that severe kerion types may be self-limited. Engman[1] cured cases of ringworm of the scalp and beard due to large-spored fungi with intravenous injections of typhoid vaccine. Lewis and Miller[2] recently reported three cases of *Microsporon lanosum* infection of the scalp which healed under topical applications. The authors felt that the local treatment had very little to do with the cure, and that recovery was in fact a self-limitation. The cases were all of an inflammatory type. The duration of the local treatment was from six weeks to six months. During the last few years I have used x-ray epilation only in extensive cases, and have cured the majority of cases in from two to three months by the use of a 3 per cent solution of iodine in carbon tetrachloride, instructing the parent to epilate a part of the ringworm patches each day with forceps. Out of twenty consecutive positive cultures from cases of scalp ringworm from the district around El Paso I have grown the following organisms:†

Microsporon lanosum	18
Microsporon audouini	1
Trichophyton cerebriforme	1

With this predominance of the one organism it seemed worth while to prepare a specific antigen, a microsporin, and have it available for the treatment of these cases. As this organism is a fairly rapid grower, one does not lose much time in its identification. Since the culture almost invariably shows *Microsporon lanosum* in

*Read in Section on Dermatology and Syphilology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

†Dr. George M. Lewis aided me in the identification of several of these organisms.

this locality, it is best to begin treatment at once and not wait for a positive identification.

Cranston Low[3] prepared an antigen from heat-killed cultures of *Microsporon lanosum*, but was wholly unsuccessful in treatment. Strickler,[4] on the other hand, found his own microsporin quite successful. In the present study both the method of preparation of this antigen and the method of administration differ from those used by the above investigators.

Preparation of the Antigen.—The organism, *Microsporon lanosum*, is planted in 30 c. c. of glucose-peptone broth and grown for five or six weeks. The mass of fungus is then removed and ground in a mortar. (A little sterile sand facilitates the grinding.) The fluid medium containing the soluble toxins is added to the ground mycelium and spores and the whole filtered through sterile filter paper. The filtrate is then placed in pyrex tubes and packed in dry ice (solid carbon dioxide). It is alternately frozen and thawed five or six times, then cultured. If there is no growth, 0.25 per cent phenol is added, and the antigen is ready for use.

Reactions.—The reaction to microsporin in a sensitized skin is an erythematous edematous area usually showing some vesiculation by the end of twenty-four hours. By the end of forty-eight to seventy-two hours the reaction has begun to subside, but a scaly erythematous area remains for several days longer. Occasionally there is slight constitutional disturbance such as malaise and fever, but this has seldom been of such severity as to annoy the patient.

All of the cases of *Microsporon lanosum* infection have reacted positively (both the inflammatory and non-inflammatory types). The *Microsporon audouini* case also gave a positive reaction, but the *Trichophyton cerebriforme* infection did not react. This would suggest a specific microsporon reaction. However, several cases of dermatophytosis also gave positive reactions to microsporin. The achorions, trichophytons, microsporons and epidermophytons are closely related immunologically as observed by Sulzberger.[5] Therefore, extracts of the various fungi of this group cannot, with our present knowledge, be of much aid in determining which organism is present.

Although the general experience with trichophyton extracts has not been very encouraging, it is possible that a selection of cases and the employment of a stronger trichophyton solution than is generally used might be attended with greater benefit in the treatment of scalp ringworm.

CASE REPORTS

Case 1.—A. S., a girl, aged 7 years, on November 25, 1933, presented on the occipital region a boggy mass

Fig. 1, Case 1.—Microsporon lanosum infection, inflammatory type.

Fig. 2, Case 2.—Microsporon lanosum infection, inflammatory type, before treatment.

Fig. 3.—Close-up of large lesion in Case 2 after course of treatment with microsporon without local treatment. Site of former lesion is perfectly smooth and bald.

the size of a half dollar of duration of one month. The lesion was partly bald, the remaining hairs being broken off short. There were several smaller crusted lesions. Hairs planted on Sabouraud's medium showed a fungus on the third day which later proved to be *Microsporon lanosum*. Masses of spores with a mosaic arrangement were found about the hairs examined in potassium hydroxide. The skin reacted slightly to the intracutaneous injection of 1:50 trichophytin and strongly to a similar test with concentrated microsporin, the area of the latter test remaining red and swollen over forty-eight hours. Three per cent iodine in carbon tetrachloride was prescribed for local use, and microsporin injected intracutaneously every two to four days, in doses of from 0.1 to 0.2 c. c. On December 26, one month after the patient was first seen, it was impossible to find spores in hairs from the periphery. The lesions themselves were entirely bald and showed no evidence of activity. The reaction to microsporin by this time was very slight. Later examinations were also clinically and microscopically negative.

Case 2.—G. F., a boy, aged 5 years, on December 19, 1933, had a partly bald, swollen, crusted lesion the size of a quarter on the vertex. There were similar smaller lesions scattered over the scalp. The condition had been present for three months and was gradually spreading. Many spores were present about the hair in typical mosaic arrangement. Culture revealed *Microsporon lanosum*. Trichophytin 1:25 gave a very mild reaction. Microsporin at the end of forty-eight hours had reacted with an area of marked erythema and edema. No local treatment was used in this case, as I wished to observe the effect of microsporin alone. The antigen was given every two or three days. On January 12, a little over three weeks after beginning treatment, the spots were smooth and hairless with no evidence of tinea. The patient was again seen two months later and the former lesions were found to be covered with hair. There had been no further activity.

Case 3.—K. R., a boy about 5 years of age, was referred by Dr. George Colvard, of Deming, New Mexico, who cooperated in the treatment. On April 27, 1934, the patient presented two partly bald, moderately inflammatory lesions on the scalp, each about the size of a quarter. There were several smaller crusted lesions. The duration was two months. An ointment of ammoniated mercury had been used without apparent benefit. On examination of hairs they were found covered with spores. On culture *Microsporon lanosum* was grown. The skin reacted strongly to both microsporin and trichophytin 1:20. Three per cent iodine in carbon tetrachloride was ordered applied twice daily. The patient received microsporin injections every two or three days. On May 10, thirteen days after beginning treatment, the patches were smooth and practically bald. Examination of all available hairs was negative. Treatment, however, was continued until May 21, when the patient showed smooth bald areas with no evidence of tinea.

Case 4.—M. B., a girl aged 3½ years, presented, on February 12, 1934, a partly bald area on the scalp one inch in diameter with broken hairs. There was very little scaling, and practically no other signs of inflammatory reaction. There were also many small lesions over the scalp and a few circinate lesions on the legs, duration six weeks. The hairs showed many spores. Culture presented *Microsporon lanosum*. The microsporin skin test was strongly positive. Three per cent iodine in carbon tetrachloride was prescribed for local use and the mother instructed gradually to epilate the lesions with forceps. Microsporin was injected every three days. The reactions gradually became less marked until March 2, when the antigen failed to react and was discontinued. The progress was slow. On March 30, six and one-half weeks from the time treatment was begun, examination of the hairs was negative. There was no evidence of the disease except the baldness. Subsequent observations were negative.

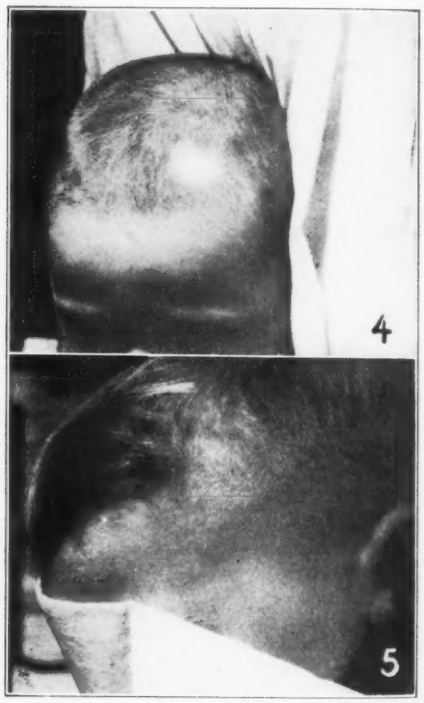

Fig. 4, Case 4.—Microsporon lanosum infection with broken hairs and practically no other evidence of inflammation.

Fig. 5, Case 6.—Microsporon audouini infection, non-inflammatory. Clinically similar to Fig. 4, but more resistant to treatment.

Case 5.—B. B., a boy aged 2 years, on February 12, 1934, presented a few small scaly lesions on the right side of the scalp with little loss of hair and no other signs of inflammation. The broken hairs showed many spores. The duration was six weeks. The microsporin test was moderately positive. *Microsporon lanosum* was grown on culture. Three per cent iodine in carbon tetrachloride was used locally and microsporin injections were given every two or three days. Examination of hairs during the course of treatment was sometimes positive and sometimes negative. The reactions

to microsporin gradually became less marked and the antigen was discontinued after two and one-half weeks. Local treatment was continued, and April 10 the patient showed no clinical or microscopic evidence of tinea (after approximately nine weeks of treatment).

Case 6.—C. G., a boy aged 4 years, on February 7, 1934, had a partly bald patch slightly larger than a dollar in the left temporal region, with broken hairs and no other evidence of inflammatory lesion. It had been present for one week and was gradually spreading. Examination of hairs showed many spores. Culture presented after six days a fungus which was later identified as *Microsporon audouini*. Microsporin injection gave a positive reaction. Treatment consisted of forceps epilation, iodine in carbon tetrachloride locally and microsporin injections. The antigen was discontinued after two weeks, when it had ceased to react. One month after beginning treatment hairs still contained spores. Soon after this the patient contracted a mild case of scarlet fever and was not seen again until May 18. Local treatment was continued during this time. On May 18 microscopic examination was negative, the hair had regrown, and the lesion was apparently cured. Five months later a small lesion appeared in another part of the scalp. This was considered a reinfection, although it is impossible to prove it to have been so. The former large lesion remained healed.

COMMENT

Six unselected cases of microsporon infection of the scalp are reported in which microsporin, a culture filtrate of *Microsporon lanosum*, was used in treatment. Five of the cases were caused by *Microsporon lanosum* and one by *Microsporon audouini*. Of the *M. lanosum* infections three were of the inflammatory type. Of these, *Cases 1* and *3* were apparently cured in one month and two weeks, respectively, both microsporin and local treatment being used. *Case 2* received only the microsporin injections, with no local treatment, and showed no evidence of the disease at the end of three weeks. In these three cases improvement was evident by the end of the first week. *Cases 4* and *5*, which were also *M. lanosum* infections, were of the non-inflammatory type. In these the benefit from microsporin treatment was not so apparent. However, these showed no evidence of infection after six and one-half and nine weeks, respectively, which is probably a little less than the average attained with local treatment alone (exclusive of x-ray epilation). *Case 6*, the *M. audouini* infection, was apparently cured when observed three months and eleven days after beginning treatment. It is doubtful whether microsporin was of benefit in this case, and x-ray epilation would undoubtedly have effected an earlier cure. I believe there is no doubt that in the inflammatory cases the microsporin had a markedly beneficial effect. In this type of case, as Lewis and Miller have observed, there is a tendency to self-limitation. However, in ten years of experience in clinical dermatology, with an abundance of scalp ringworm, I do not recall any previous cases which were cured as easily as these. There was apparently a shortening of the course of local treatment in the two non-inflammatory *M. lanosum cases*. I believe the effect of the concentrated microsporin is an intensification of the inflammatory reaction in the lesions; in other words, a focal reaction, and consequent loosening of the hairs. The effect was observed clinically, especially in *Cases 2* and *3*. In addition, there is a degree of desensitization which is shown in the diminishing reactions to microsporin.

This communication is in the nature of a preliminary report, and further experience is necessary before a final evaluation of microsporin can be made. It is presented here because the experience thus far indicates that it has some value, and in the hope that others will try this antigen in the treatment of appropriate cases of ringworm of the scalp.

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DISCUSSION (*Abstract*)

Dr. C. F. Lehmann, San Antonio, Tex.—The value of trichophytin as a therapeutic agent is being questioned, and it has been practically discarded because it failed to give a specific effect and prompt cure. However, I do not believe that the last word has been said concerning trichophytin in the treatment of trichophytosis. Occasionally we have seen beneficial results for which nothing else could be credited. I will admit that there are very few. It has been my observation that the cases which were helped by the use of trichophytin were recurrent vesicular types, particularly those manifesting a mycotic dyshidrosis of the palms with the foot infection.

It is of particular interest to me to note that Dr. Smith had his best results in cases which had a focal reaction in the scalp after the use of microsporin, or had inflammatory ringworm in the beginning of the use of microsporin. He obtained cure in 3 weeks in a kerion

case; and slow improvement (6½ weeks) in a case in which no inflammatory lesion was present. Because of the fact that trichophytin does help vesicular types and microsporin has been shown in these few cases to be of value in types with enough irritation in which there were broken down cells, I am led to believe that the antibody formation may be concerned with the breaking down of epithelium cells that are infected with the fungus. In other words, does this breaking down of protoplasm yield antibodies only when the vaccine is used?

This work of Dr. Smith's should be encouraged and elaborated upon. It opens a new vista in therapy of scalp ringworm. We in Texas fail in the majority of cases to secure prompt cure by the use of topical applications, and we have to resort to epilation much more frequently than is done in some other parts of the country. An exception to this rule is a case that has a secondary pyoderma or a kerion. In these cases, as is known, the fungus leaves the scalp after the pus infection is cleared. This, I am sure, is the principle underlying the success of the old-time methods of treating ringworm of the scalp; for instance, the use of mercury and iodine setting up a violent inflammation. In these types in private practice, if one sets up a violent inflammation in a case, the mother seeks another doctor.

Whereas epilation, if done correctly with x-ray, gives us good results and few hazards, we welcome some other method of treatment that is simpler, and it is hoped that ringworm vaccines will satisfy this need in therapy.

Another value of this paper will probably be the stimulation of interest in cultural studies of scalp infections, so that we can determine the incidence of infection with the various species of trichophyton. When this is done we shall probably know more about adapting our various lines of therapy to the various species.

Dr. Jeffrey C. Michael, Houston, Tex.—This is an exceedingly interesting presentation. When Dr. Smith sent me a copy of his paper a week or so ago, I immediately started preparation of microsporin to check his results. However, it should be suggested to any who are interested in trying this treatment that they check their own microsporin with some of Dr. Smith's, which I hope he will prepare for some of us, since it is possible that some mycins may be weaker than others in antigenic power. Dr. Smith's report is a preliminary one and the number of cases treated by him are few; therefore, it can be said only that further experience will be required to evaluate the method. He certainly deserves every encouragement in this attempt to improve the therapy of tinea capitis.

Most of the cases of tinea capitis seen in Houston are caused by *Microsporon lanosum*. Of the last twenty cases, eighteen were due to this organism, the other two to *Trichophyton gypseum*. This parallels the El Paso experience. I believe that knowing the type of infecting organism is of value in estimating the response to topical applications. *M. lanosum* seems to respond the most readily of all to local parasiticides, while organisms of the gypseum group are very resistant.

Dr. Howard King, Nashville, Tenn.—In Middle Tennessee and the surrounding territory from which we draw patients, we have never found it necessary to epilate any scalp for ringworm. Neither have we made any effort to classify the particular kinds of organisms in our cases.

Some eighteen years ago, while I was visiting Drs. Engman and Mook, of St. Louis, Dr. Mook told me that they had rarely found it necessary to epilate a scalp for the treatment of ringworm, also saying that ringworm of the scalp as seen in the Mississippi Valley region practically always got well from the use of sulphur ointment.

On returning home I immediately begun that plan with some modifications. Most of our cases as first seen present some pustular folliculitis and occasional kerion. For this reason, I modified Dr. Mook's plan of treatment by using 8 per cent ammoniated mercury ointment for the first two weeks and 8 per cent sulphur ointment for the next two weeks, alternating these two remedies every two weeks until the patient got well. From my observation, these patients got well in three months. I usually tell the mothers to expect the child to be well in three months.

Dr. Morris Moore, St. Louis, Mo.—Being a mycologist, I am, of course, extremely interested in Dr. Smith's paper. Unfortunately, because of the highly specialized nature of mycology and fungus taxonomy, medical men in practice do not have a great deal of time to devote to the classification of these pathogens. The result is that a number of diseases diagnosed possibly as *Microsporon* infections clinically turn out to be a *Trichophyton* infection, culturally and microscopically. One is also often confused with the species determinations of both the microspora and trichophytons. From the standpoint of therapeusis, specific classification is not so extremely important, except where particular cases are to be treated with the specific fungus, as with trichophytin. Contrary to the general and commonly held opinion as to the etiology of kerion, which Dr. Smith mentioned, mycologically this type of infection, or true kerion, which is to be distinguished from pseudo-kerions or lesions simulating this type of condition, is caused by an organism known as *Ectotrichophyton asteroides* and not *Microsporum lanosum* or *Microsporum audouini*. These latter two organisms may cause lesions which are difficult to differentiate from the former.

For the benefit of those present here who are not familiar with fungi and fungus infections, let me give you a brief characterization of this group of pathogens. The microbes as a whole are divided into four major groups: the Phycomycetes, including the many low forms of fungi, as water moulds; the Ascomycetes, which are the ascospore producers and have a great number of pathogens; the Basidiomycetes, comprising the mushrooms in general; and the Fungi imperfecti, those organisms the life cycles of which are not at all or incompletely known, and the dumping ground for most of the medical fungi. On the basis of their activity with relation to the human body, the pathogenic fungi are placed in one of three groups clinically: the cutaneous type, those causing skin infections and superficial lesions only, with no invasive powers, as most of the dermatophytes; the subcutaneous type, those that may

occur both on the skin and the internal organs, as the organisms of blastomycosis; and the systemic type, those that occur primarily in the internal structures with possibly an occasional manifestation on the skin, as the organisms of torulosis. With relation to the dermatophytes and the *Trichophytons*, the organisms are divided into several groups again: the endothrix type with the fungus occurring within the hair shaft or substance; the neo-endothrix type with the organisms occurring chiefly within the hair substance and occasionally on the surface; and the ectothrix form, with the organism growing not only within the hair substance, but also growing actively on the surface and spreading out on the scalp. The true kerion is caused by an organism of this group.

Dr. Michael and Dr. Engman pointed out a difference in the result of treating the *Microsporon* or *Trichophyton* infection in the East and West. I agree with them as to the difference and would like to add a few of my own observations, both in the East and in St. Louis. In the first place, I have been able to notice a somewhat different fungous flora in St. Louis than in the Northeast. Apparently there is a more hardy and resistant type of organism in the East than in the West with, as Dr. Engman mentioned, a greater number of cures in the West than in the East. *Microsporum audouini* is not so common in the Midwest as is *Microsporum lanosum*. At our clinic, at the Barnard Free Skin and Cancer Hospital, a man came in with a ringworm of the beard. He was cultured and the organism was found to be *Microsporum lanosum*. A short time later, about three weeks, he mentioned that his dog had an infection of the head, which was of six months' duration. The dog had been treated by a veterinarian with no result. He brought the dog in and I cultured the same organism from the dog. About a week later the man came in with his daughter, who had an infection of her fingers. The same organism was cultured. Here apparently were two cases in the same family which had been infected from the same focus, the dog.

I should like to conclude by emphasizing the need for more time in identifying the organisms, both for the benefit of the profession and the patient.

Dr. Toulmin Gaines, Mobile, Ala.—In further corroboration of what has been said in this discussion, I wish to call your attention to a paper written by my confrere on the curability of ringworm of the scalp without x-ray. This paper was read by title before our Section at Richmond and subsequently appeared in the JOURNAL. Dr. Fred Wise, a former guest of our Section, wrote to the author after seeing his paper and stated that the form of ringworm generally seen in the South was caused by animal-borne fungi and was amenable to such treatment as he described, but that in the North many cases were seen that were resistant to all treatment except the x-ray, this being especially true of *Microsporon audouini*.

Dr. Smith (closing).—Although this is a preliminary report, the results obtained have been encouraging. Further work is necessary before we can accurately evaluate microsporin therapy in tinea capitis.

CANCER OF THE FACE AND ORAL CAVITY: SURGERY VERSUS RADIATION*

By ALBERT O. SINGLETON, M.D.,
Galveston, Texas

For the past few years we have been more and more dissatisfied, and often quite discouraged, with our results in the treatment of patients with cancer of the face, lip, tongue and oral cavity. This has prompted us to review some of our records of these cases back for more than twenty years. The records of the patients from 1912 to 1920 are compared with those for the period of 1922 to 1930. This study has revealed several interesting facts and has resulted in our being still further dissatisfied with our results in the treatment of these conditions.

The John Sealy Hospital, the teaching hospital of the University of Texas, in which this study is made, is largely a charity hospital. The follow-up records are far from complete because the patients are mostly without permanent residences and are drawn from a number of widely scattered communities. Still the study may be of value because it probably represents conditions existing in a large number of similar institutions, in which, in the whole country, probably 75 per cent of the cancer population are treated.

This study reveals that the mortality from cancer of the face and lip is high; that the mortality for cancer of the tongue is higher and that cancer of the oral cavity elsewhere is only occasionally cured. The review also shows that the percentage of three to five year cures is much lower during the last period than during the former.

Although nothing like complete follow-up records are available, still we find that in the first group 24 per cent died in the hospital as compared to 37 per cent in the latter group.

Table 1

DIED IN HOSPITAL

	No. Patients	Died in Hosp.	Per Ct.
1912-20	82	20	24
1922-30	101	38	37

Again we find that in the first group of patients followed 32 per cent died in the hospital

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*From the Surgical Department, University of Texas.

or within five years after leaving the hospital, as compared to 44 per cent in the later group.

Table 2

KNOWN DEAD WITHIN FIVE YEARS

	No. Patients	Died	Per Ct.
1912-20	82	27	32
1922-30	101	45	44

The first question naturally arising is what is the cause of the increasing mortality? In order to answer this question we look to see what difference there has been in the methods of treatment in these two groups, and whether the treatment has influenced the mortality? In answering these questions we find that in the former group surgery alone was used, while in the second group surgery with varying amounts of radium and x-ray was used. If we did not look further one would infer that the addition of radium and x-ray had retarded rather than improved our results, but a close scrutiny shows a more concrete reason, and that is the difference in the stage of the disease when the patients were received for treatment.

Table 3

	Patients	Per Cent Inoperable	Per Cent Operable
1912-20	82	21—25½	61—74½
1922-30	101	46—45½	55—54½

In the first group a much higher percentage were received earlier in the disease with fewer glandular metastases and a smaller number were classed as inoperable or incurable, while in the latter group a greater number were received late in the disease with more extensive ulceration and glandular involvement. In the former group of those which were received late, some had been treated with caustics and pastes, and some had had incomplete surgery, such as local attempts at surgical removal of the lesion with recurrence, or a failure to remove the glands of the neck. Of the latter group a few had had paste and caustics applied, a few incomplete surgery, while a very large number had been treated by radium and x-ray without surgery. For fear that I may be misunderstood, I should add here that incomplete treatment by radium and x-ray were generally used. These preceding statements lead me to the chief subject of my paper, which is the discussion of the conflict, in the treatment of these conditions, between surgery and radiation.

Twenty years ago, and previously, only surgical treatment was available for cancer and our chief concern was in getting the patient to the surgeon early and getting him into the hands of a competent surgeon. Subsequently, as our records show, a larger number of cases of cancer of the face and mouth were received early and the number of cures was fairly high in the early cases.

Quite a different situation exists at the present time. The impression among the profession is that there are two remedies for cancer, one surgery and the other x-ray and radium. The general practitioner sees the patient first and tells him to go to the radiologist or to a surgeon. The patient naturally selects the radiologist who gets the first try at him. There are many who use radium and x-ray who are not trained in its therapeutic use. At the present time there are probably more incompetent physicians using these agencies than there are incompetent surgeons, if such a thing be possible. The radiologist to whom the patient has been referred, though not properly trained and equipped, feels it his duty to attempt treatment. Inadequate treatment being given, the disease is not cured; valuable time is lost, and the patient loses confidence in the profession as a whole. He often then goes to a cancer quack and finally enters the general hospital too late for the best surgery and radiation therapy combined to be of any benefit to him.

Even among the best of surgeons and radiologists there is a conflict of opinions as to the method of treatment, as a result of which the patient does not receive all that science can supply in these conditions. The surgeon has felt considerable resentment that the treatment of cancer is drifting more and more to the radiologist. Having seen many patients previously unsuccessfully treated by radiation, the surgeon has felt that the radiologist's reports are incorrect when claims are made for many cures.

What does surgery offer? Surgery in cancer of these regions reached its maximum possibilities many years ago. The plan of operation advocated by Butlin, Whitehead, Langenbeck and Kolher in Europe, and Crile, Ashhurst, Thompson, Halstead, Warren, Stewart and others in this country became generally accepted and little change has resulted from that time until this. This plan was founded upon the fact that cancer of the face and mouth metastasized exclusively by way of the lymphatics and the operation must have as its object the removal of the lymphatic tissue draining the diseased area, as well as the complete eradication of the disease lo-

cally; and in the hands of the well trained and experienced surgeon results have made this form of treatment well worth while.

Butlin's[1] statistics, collected from Kronlein, Kocher, Whitehead and himself, show by radical operation 20 to 25 per cent cures in all cancers of the tongue. In operable cases with dissection of the lymph nodes and local excision, 42 per cent were well five years in Butlin's own cases. Surgeons have been shooting at this mark since Butlin's time.

Robt. H. Kennedy[2] in cancer of the lip reports 67 per cent well three to five years after radical operation and urges dissection of the lymph nodes of the neck. He says that in "no other part of the body, except in the head and extremities, does any surgeon consider that he is doing a proper operation for cancer unless he removes the regional lymph nodes."

Fischel,[3] in a study of 240 cases of cancer of the lip and oral cavity with radical surgery, reports 40 per cent of five year cures; 70 per cent of cures when the lymph nodes of the neck were not involved and 24 per cent cures where the lymph nodes were involved. In 90 lip cases, 90 per cent cures were reported where lymph nodes were not involved and 60 per cent cures where lymph nodes of the neck were involved. Fischel further states: "The significant facts are that the percentage of cases alive after five years in which neck dissection was done before the glands were involved is much greater than in cases where the glands showed carcinoma; and that of 48 cases in which cancer was demonstrated as having formed metastases in the cervical lymph nodes, 35 per cent were alive five years later with no recurrences. These results cannot be approximated in the case of proven metastases to lymph nodes by any form of treatment other than radical surgery."

Carl Eggers[4] urges radical surgery with removal of the lymph nodes in all cases of cancer of the oral cavity.

Blair[5] states: "Some of the worst glandular involvements that we have seen has occurred in patients who have been treated locally with radiation. Any person who has had cancer of the lip or mouth may have glandular recurrence at any time up to eight years, and therefore the glands of the neck should be removed and the patient observed frequently for recurrence."

Taylor[6] reports on cases observed of cancer of the mouth in the Massachusetts General Hospital over a period of three years with surgical treatment almost exclusively.

Cancer of the tongue, 22 cases, 8 cures, 36 per cent.

Cancer of the cheek, — cures, 32 per cent.

In 35 per cent of cases glandular dissection was performed. Deaths from operations were five, all resulting from operations upon the primary growths rather than neck dissection. Radiation was used, but he does not consider that it contributed to the cures.

What does radiation offer? The roentgenologists claim remarkable cures in the treatment of cancer of the face and oral cavity in innumerable articles published largely in their publications. Their claims for success are often so far superior to surgical results that it is difficult to believe that we are considering the same disease.

Some roentgenologists make claims for remarkable cures without surgery, even condemning surgery entirely, while others are inclined to advocate surgery in a limited number of cases.

Schreiner and Mattick[7] report the following results obtained by radiation treatment of cancer of the lip:

(1) No lymph nodes involved, 163 cases, 75 per cent five-year cures

(2) Nodes involved, 38 cases, 21 per cent five-year cures

(3) Inoperable, 80 cases, 1.2 per cent cures

Kelly[8] condemns surgery, advocates radiation exclusively, and reports 133 patients out of 200 with cancer of the lip well two years or more, and about 62 per cent cured out of 99 cases. Seventy-two were alive five years, or 73 per cent.

Duffy[9] reports from the New York Memorial Hospital a study of 1,363 cases of oral cancer treated by radiation.

993 cases with no palpable lymph nodes, 70 per cent cures

175 cases with palpable lymph nodes, 14 per cent cures

205 cases considered inoperable, 16 per cent cures

He concludes: "Very few patients who are admitted without cervical lymph node metastases develop metastases in that region. A probability of cervical nodes is determined not only by stage of metastases, but also by grades of malignancy of the primary lesion.

"Conservatism is maintained at the Memorial Hospital in the case of patients without cervical metastases and the field of operation is being narrowed down as experience is gained in the use of gold tubes in the advanced and border line cases of cervical metastases from the intra-oral cancer." Duffy further condemns surgery generally in the treatment of cancerous lymph nodes.

Stewart,[10] reporting from the Steiner Clinic at Atlanta, Georgia, on 257 cases of cancer of the lip and oral cavity, gives the following conclusions:

(1) Metastasis from intra-oral carcinoma is usually to the neck and proves fatal.

(2) There is no completely satisfactory therapy. Some of the advanced lesions are excised with the cautery, but the prophylactic dissection of the neck is a farce. Irradiation is more logical for prophylaxis. If nodes develop in radio-resistant carcinoma, they should be removed widely. He says: "I am forced to conclude that cervical metastasis, like cancer anywhere else, is not a problem for the surgeon or radiologist. It requires the combined efforts of all medical services and then leaves much to be desired."

This review cannot be complete without reporting the opinion of J. C. Bloodgood,[11] whose study of this question is necessarily of great value. He says: "In cancer of the tongue when the lymph nodes are involved the probability of five-year cures is 10 per cent; if they are not involved, it is unnecessary to remove them. In cancer of the lip the reverse is true. If lymph nodes are involved here, 50 per cent are curable.

"In cancer of the tongue, the nodes that should be removed are less accessible than in cancer of the lip. In the tongue cases we must remove the subparotid group. To do this one must excise the sterno-cleido-mastoid muscle and the external jugular vein. In cancer of the lip it is sufficient to remove the submental and submaxillary groups. The great majority of the profession, and even of surgeons and pathologists, do not realize that the recorded evidence in the literature of operative cancer cures is based on operable cases. Inoperable cases are excluded, and then again among the cures, especially in the early cases, there is a large element of error in the pathologic diagnosis in calling or including malignant warts, or areas of hypertrophy with suspicion of malignancy or cancer. It is justifiable today to state that the chances of curing late cancer are relatively small as the chances of curing early cancer are relatively large."

Thus we see from this review the wide variance of opinions as to the procedures to be employed in dealing with cancer of the above named regions.

DISCUSSION

There are enough known facts if properly and promptly applied to solve the cancer problem. Cancer must be found early if many are to be cured. But whether early or late, the management must be in the hands of the well trained. The radiologist must admit that surgery has an important place in curing cancer. The surgeon also can no longer ignore the results of radiation. While surgery some years ago reached its zenith in this field, radiation is still progressing. With increasing experience, new methods are being developed with great improvement in results. We as surgeons must keep an open mind and accept improvements as they are proven. Radiation is very dangerous as it is now generally used by the poorly informed and poorly equipped, but, on the other hand, in the hands of the well trained and well equipped, great things are being accomplished. Again, it is hardly possible to expect the surgeon to be an expert radiologist and to be familiar with the changing technic of x-ray and radium. Also, one does not expect the radiologist to be able to use the good points of surgery. Therefore, if the patient is going to have the advantage of everything that can be done for him, the surgeon and radiologist must work jointly.

The Pathologist.—I cannot conclude this subject without a few words about pathology and the pathologist. There is a wide variation in the degree of malignancy of the diseases we are discussing. Broder's graded classification of malignancy has been a tremendous aid in directing treatment. The same treatment would not necessarily be given to a Grade I growth as to a Grade IV. Therefore, without the microscopic study of the primary growth one is not justified in outlining the course of treatment, and I think the surgeon should urge and stand out for a microscopic diagnosis of all growths before treatment is planned. The conscientious surgeon has insisted for a very long time that pathologic study of tissue is essential to sane treatment, and though he may make many concessions to the radiologist, this practice should still be insisted upon. Even the difference between basal and flat-celled epithelioma cannot positively be made clinically. The clinical differentiation between hyperplastic lymph nodes and cancerous nodes is difficult clinically. The grade of malignancy in the metastasis, except rarely, is the same as the primary growth, therefore the plan of treatment for the metastasis can be more intelligently made if the original growth has been passed upon by the pathologist. As Horsley[12] says:

"It is becoming more and more necessary to hitch up pathology with all clinical treatment, for clinical treatment cannot be intelligently carried on without some knowledge of the organic pathologic changes or the perverted physiology that causes the disease. Therefore, we feel that the pathologist is an indispensable part of the combine for the treatment of cancer."

COMMENT

The cancer problem is far from being solved in spite of the publicity campaigns which have been instituted during the past ten years. In the first place, institutions properly equipped are not available for the poor, who make up a large part of our population. Great strides have been made in providing for cure of the indigent crippled children, but not for the cancer victim. Secondly, the cancer patient is going and is being sent to roentgenologists, the great majority of whom are not equipped or properly trained in the use of radiation. This has resulted in a higher mortality in cancer of the face, lip and oral cavity at this time than twenty years ago. The mortality with the best surgery and the best radiation is still high. Improvement in the equipment and training of roentgenologists, with a closer cooperation between the surgeon and roentgenologist, is greatly needed at this time. In the general hospital every cancer patient should have the benefit of the combined efforts of the departments of surgery, radiology and pathology.

I am greatly indebted to Dr. Sam Wallace, my associate, for his painstaking review of the hospital records of this subject.

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DISCUSSION (*Abstract*)

Dr. Ellis Fischel, St. Louis, Mo.—For the proper evaluation of any therapeutic agent many factors must be taken into account. In his title "Surgery Versus Radiation" Dr. Singleton hints at these factors when he suggests that surgery does not always mean good surgery and radiation is administered too many times by physicians who lack either training or knowledge. It has happened to me more than once that a case has been referred from a competent surgeon with a statement somewhat as follows: "This patient had carcinoma of the mouth with a metastasis to the submaxillary gland. I did a complete dissection of the metastasis. There is apparently more carcinoma present. Can anything further be done for him? "The referring surgeon has been honest and tried to do the right thing by his patient, but has not fulfilled, by any means, the possibilities of surgery, through failure to appreciate what is indicated by surgery of the lymph-bearing area of the neck in reference to metastases from intra-oral cancer. Similarly, I have seen cases of cancer of the lip and oral cavity treated by radiation (either radium or x-ray) in which repeated exposures had been given with extreme torture to the patient and failure of eradication of the disease. The radiologist or radium therapist had failed to appreciate that when once tissue is irradiated to the full tolerance dose if the cancer is not cured, further irradiation is not only useless, but exceedingly harmful. These are examples of what is taking place today in the therapy of cancer of the face and oral cavity in all parts of the country.

In 1922, when I first visited Texas as a guest of the Texas Surgical Society, the controversy over the value of surgery versus radiation was just beginning to assume an acute stage. At that time I stated that it made little difference what method of treatment was employed for the primary lesion; the important thing was to apply the chosen method to the point of complete eradication or destruction of the malignant growth. Surgery and radiation are both destructive, one rapidly, the other slowly. Both are effective in the treatment of local lesions, but the therapist, be he surgeon or radiologist, must appreciate fully the extent of the local disease in order to destroy it.

The experience of Dr. Singleton in his interesting analysis of patients admitted to the John Sealy Hospital is most interesting, inasmuch as he demonstrates by figures the situation as it exists today. Ten to fifteen years ago the radiologist complained that he saw only late, inoperable or recurrent cases of cancer. Now, as Dr. Singleton has pointed out, the surgeon receives many advanced cases which have been treated first by the radiologist. Neither radiologist nor surgeon has any really accurate method by which the relative efficacy of either form of treatment can be estimated. The treatment of cancer is such an individual matter and the therapeutic agents so highly technical in their application that it is impossible for any one man to be equally well versed in all forms of therapy.

In my own work as early as 1918 I was convinced of the curative value of radium in the treatment of certain types of malignancy, particularly of the lower lip. I recognized in radium a valuable adjunct to our armamentarium. As a surgeon my mental attitude toward the employment of radium has been to use it as I should any other destructive agent in the treatment of cancer. It does slowly and with a minimum loss of tissue what the actual cautery does quickly. It is just as essential for success to use radium with as much accuracy and care as the cautery. The absence of shock, hemorrhage and immediate risk to life and short, if any, hospitalization, make the choice of radium evident; but there is a mortality from the use of radium and in cases where its use is followed by slough, the pain is much more severe than the pain following surgery.

As far as I, personally, am concerned, there is no controversy between surgery and radiation when we consider the proper treatment of possible metastases to the cervical lymph nodes. In spite of improved technic, vastly more powerful x-ray apparatus and more and more radiation obtained from larger radium bombs, I am still to be convinced that radiation treatment of proven metastases to cervical lymph nodes from squamous cell carcinoma of the lip or oral cavity is of any value as a curative agent. And neither can I admit that it has value as a so-called prophylactic agent. On the other hand, both through an analysis of the cases at Barnard Free Skin and Cancer Hospital, and throughout the articles appearing in the literature during the last thirty years, one can find ample proof that properly performed surgery will "cure" a certain admittedly small percentage of proven metastases (50 per cent from the lip and 13 per cent from the oral cavity, according to Barnard Free Skin and Cancer Hospital figures). The so-called prophylactic treatment of cervical metastases is somewhat a misnomer, since there is no reason to treat cervical lymph nodes at all, either by radiation or surgery, unless cancer be present. It is upon the impossibility of determining, in many cases, the presence of cancer in lymph nodes that the rationale of treatment depends. It cannot be considered good therapeutic practice today to omit careful removal of the lymph-bearing tissue of the axilla as part of the radical operation for cancer of the breast; I believe it is even less logical to omit a thorough, painstaking removal of the lymph-bearing tissue of the neck

as part of the treatment in all cases of squamous cell carcinoma of the lip or oral cavity.

The role of the pathologist, as emphasized by Dr. Singleton, is of great importance and I agree that his findings should be seriously considered. Cancer is not always easy to recognize and occasionally repeated sections for microscopic study must be procured in order to establish the diagnosis. However, I do not feel that our therapeutic effort should be unduly influenced by grading, although the probable outcome of the effort can be more accurately foretold by the grade of the tumor.

Team consideration is certainly desirable in order to obtain better results than are today obtained in the treatment of cancer and should be striven for by the organization of tumor clinics in all of our progressive general hospitals.

Dr. Charles S. Venable, San Antonio, Tex.—There is no such thing as a given mode of attack, nor may it be said that this treatment is better than that or that treatment better than this. I am disappoined in any surgeon who professes to cure cancer by operation alone, whether by radical extirpation, electrosurgery or actual cautery, and equally disappointed in the radiologist who presumes or offers to cure cancer through radiation.

As has just been said, it is necessary that the surgeon and radiologist get together and jointly give the patient the benefit of all that is available. Morbidity and mortality would be lessened were each case so discussed.

In addition there is another factor that certainly has seemed to be of a material benefit in controlling the morbidity and prolonging life, though possibly it does not greatly affect the mortality. Time of observation is still too short to know. After ascertaining the sugar tolerance of the patient, maintenance, through diet and insulin if necessary, of a normal sugar ratio as was outlined to you yesterday by Dr. Dudley Jackson is important. I have followed Dr. Jackson closely for the past five years and have observed uniformly that with increasing grades of malignancy there is a decrease of sugar tolerance and that under sugar control there is improvement locally as well as generally; and that the interval or recurrence seems to be lengthened in the advanced Grade III or Grade IV cases or the severity mitigated.

If those of you who are interested will consistently follow your cases according to Dr. Jackson's technic for a year you will be impressed as I have been that one more weapon has been placed in our hands. But this war is far from ended and the millennium is not yet.

Dr. Singleton (closing).—I feel that a great majority of cancers treated in the general hospitals are not given a fair chance, primarily because they are inadequately treated by radium and x-ray before they reach the general hospital in a majority of cases, and secondly, because there is not proper coordination between the radiologist, pathologist and surgeon in the care of these patients. I am in hopes that these defects will be remedied, and we can show an improvement in the number of cases cured rather than a greater number of failures as we are showing at the present time.

ROENTGEN THERAPY IN MAMMARY CANCER*

By Roy G. Giles, A.B., M.D.,
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The intense study of cancer in the past twenty-five years from the experimental, bacteriological, physiological, endocrinological, chemical, pathological, surgical and radiological angles has resulted in the development of a more modern conception of cancer, yet its cause remains a baffling and unsolved problem.

In the treatment of mammary cancer the patient should receive first consideration, regardless of the stage in which he is admitted for medical care. Often it has been said that the fate of the cancer patient rests in the hands of the first physician consulted. The best interest of the patient is served only by the closest cooperation of the surgeon, radiologist, pathologist, internist and general practitioner. Only through a better understanding of the pathology, histology, radiosensitivity and the various paths of metastasis may one be on the lookout for secondary manifestations. If there is delay until the metastatic lesions reach such size that they cast shadows we cannot hope to gain a better understanding and attain a more scientific knowledge of the cancer problem, nor can we hopefully anticipate a better outlook and prognosis.

This paper is based on the treatment of the cases of early as well as advanced mammary cancer observed in the Scott and White Clinic during the six-year period of 1923 to 1928, inclusive. The series of 191 cases is divided as follows: one hundred twenty-eight (67 per cent) had primary operation in the clinic; twenty (10 per cent) were operated upon elsewhere; and forty-three (23 per cent) were considered inoperable on admission.

In this series the cancer site was not recorded in seven, the right breast was involved in eighty-five, the left breast was involved in ninety-four, and both breasts were involved in five cases.

Microscopic reports were available in one hundred twenty-two (95 per cent) of one hundred twenty-eight cases operated upon in the Clinic. In forty-seven (39 per cent) the condition was limited to the breast and seventy-five cases (61

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per cent) showed microscopic evidence of involvement of axillary lymph nodes.

The results in these cases are tabulated as follows:

BREAST CANCER

FIVE YEAR CURES OR LONGER

Primary Operation in Scott and White Clinic in 102 Cases

	Total	Untraced	Traced	Well	Per Cent Well
No glands involved	41	4	37	29	78
Glands involved	61	11	50	33	66
Total	102	15	87	62	71

Palliative Operation in Scott and White Clinic in 20 Cases

No glands involved	6	0	6	2	33
Glands involved	14	1	13	1	7

	Operated upon in Hospital	Operated upon Elsewhere	Inoperable
Total	122	20	43
Traced	106	15	21
Skin metastases	10	?	?
Pulmonary metastases	11	6	1
Skeletal metastases	10	1	5
Untraced	16	5	22
Skin metastases	6	2	4
Pulmonary metastases	2	5	4
Skeletal metastases	2	1	5
Primary cancer cervix	1	0	0
Secondary cancer fundus	1	0	0
Roentgen pneumofibrosis	1	0	0
Both breasts	3	1	1

Fifteen of the twenty cases operated upon elsewhere were traced. Of these, only five had pathological reports and all showed axillary involvement. Two of these were living and well after six and eight years, respectively. Two others lived six years. Chest metastasis was noted in six and bone metastasis in one of the traced cases. The five cases not traced all had chest metastasis and one bone metastasis on entry to the Clinic. One had involvement of the opposite breast.

A detailed study of the forty-three inoperable cases indicates that they were all well advanced cases clinically. Of the twenty-one cases traced, five had extensive osseous and one chest metastasis. X-ray treatments were given in fourteen of these.

Of the twenty-one cases in the inoperable group not definitely traced, the clinical record, together with the effort made to trace these patients, indicates that probably nineteen died within the first year. Nearly all these patients were utterly hopeless except for possible slight palliation from any type of treatment. The other three had x-ray treatments and two were known to have lived two years and one three years. Both breasts were involved on entry in only one case. Five showed chest and four bone metastasis at the time of seeking medical care.

Considering the 122 cases reported upon in the Clinic, approximately 96 per cent had postoperative x-ray therapy. One hundred six of these were traced and sixty-five (61 per cent) remained well for five years or longer. Three cases developed mammary carcinoma in the opposite breast. Thirteen cases showed skin metastasis, eleven metastatic involvement of the chest, and ten metastatic involvement of the bones. One case developed primary adenocarcinoma of the cervix one year after operation and is in poor health, but living six years after radical mastectomy. Another case developed secondary carcinoma of the uterus three years following radical mastectomy and lived seven years following radical breast amputation.

One case operated upon early in 1923, followed by three 200 kilovolt roentgen treatments, developed roentgen pneumofibrosis, recognized two years following her radical surgery, and is still living and well eleven years later.

The medical profession has attacked the cancer problem in three ways: first, early diagnosis; second, improvement in surgical treatment; third, improvement in radiotherapy.

(1) *Early Diagnosis.*—Since carcinoma of the breast is not painful in its early stages, it may attain considerable size before it is discovered by the patient. The number of cases reporting with involvement of the lymph nodes is not decreasing. Lynham, London, concluded that at least 75 to 90 per cent of all cases of mammary cancer are in the stage of skin involvement, adhesions to the muscles, glandular invasion or widespread metastasis when first admitted to medical care. Harrington is of the opinion that present clinical methods are inadequate to detect malignancy of the breast until it is well advanced. This condition can best be remedied by a continuation of the slow and positive proc-

ess of education of the profession and then of the laity as is being carried out by the American Medical Association and the various cancer societies.

(2) *Improvement in Surgical Treatments.*—If we go back approximately 50 years to the days of Pasteur and Virchow, we find that the treatment of cancer was haphazard at best, and based on empiricism and ignorance. Through the new development of pathology and bacteriology at that time, the general interest in cancer was transferred to surgery, so that in a comparatively short time surgery made more progress than had been made during the many centuries preceding. Since the introduction of the radical Halstead operation in 1894 for the treatment of mammary cancer the medical profession has been taught by precept and example that radical surgery is the only method. The history of the treatment of mammary cancer is perhaps what we should expect in a conservative medical profession such as ours.

Surgery is based on the hypothesis that the mammary lesion is so localized that it has not extended beyond the area that can be excised. Unfortunately this ideal condition is present in a very small percentage of cases seeking medical advice, and in the majority the foci have developed throughout the gland and extended into surrounding structures, or the cancer has metastasized to adjacent lymph nodes or more distant structures. Statistics indicate that when the axillary nodes are involved cancer cells remain following the most skillfully performed radical operation for mammary cancer. The supraclavicular and parasternal lymph nodes are seldom removed, because the lack of clinical evidence of involvement and the technical inaccessibility of these lymph nodes. It seems certain that the most radical mastectomy is of little value, as far as cure of the patient is concerned, when malignant cells remain in the field of operation or in the neighboring structures.

(3) *Improvement in Radiotherapy.*—In 1925, Portman compiled a number of statistics showing that the average duration of life for patients with cancer of the breast is about three years and that the average case may live as long untreated. We should remember that mammary cancer in its outset is a comparatively localized disease, lasting for varying periods of time, during which none of the structures essential to life are affected, and that they may be more or less destroyed by cancer without any apparent effect on the health of the patient. Certainly there is room for an open mind on the subject, because the best figures for five-year cures under surgical treatment, taking all cases into consideration, are not to be looked upon with pride. In the late cases the percentage of patients benefited is lamentably small.

Surgeons and radiologists should not expect favorable results in every case, because those cases that respond well to irradiation respond well to surgery. The prognosis is therefore influenced by the same conditions whether irradiation or surgery is used.

Clinically, it is impossible to estimate many of the individual characteristics of the lesion. The duration of the disease, the size of the tumor, the rate of growth, the presence or absence of metastasis and the infiltrative and destructive character of the growth influence the histologic phase of the tumor. The most important factors in the prognosis of any growth are the specific attributes of the tumor and the individual himself.

The object of irradiation is to devitalize the cancer tissue producing a killing effect upon a proportion of the cancer cells and locking the malignant cells in a fibrotic mass. The disease will remain a localized process if the irradiation strangles the cancer cells by the production of fibrous tissue, and the malignant cells are starved by endarteritis and diminished blood supply.

Radiation therapy is not a mechanical, fixed process, the choice of methods depending upon the clinical condition present. It becomes most difficult to evaluate correctly x-rays and radium, because they are used largely in the treatment of inoperable and metastatic cancer where palliation is the most that can be expected. Little credit is given these agents for what they actually accomplish, and too often the thoughtless are disappointed that the impossible has not been achieved.

Postoperative Irradiation.—Postoperative roentgen therapy has been considered of great value by many surgeons. Trout and Peterson are of the opinion that results in the treatment of mammary cancer are markedly improved with irradiation following radical surgery, and they report that a recent questionnaire showed 87 per cent of the surgeons in accord with their opinion. Smith and Bartlett studied 234 cases in the light of our present knowledge of grading and irradiation and concluded the results were uniformly better after postoperative x-ray treatments as to gross figure,

type of operation and the degree of malignancy. The report of the American College of Surgeons in 1929, in general, concluded that irradiation does not add anything to the results of radical surgery in the early cases, but that the value of x-ray in the treatment of recurrences is well established. Regarding this report, Pancoast says: "It is a step in the right direction, but almost without value at this time." In other words, since the report deals with the cases of 1918, 1919 and 1920, it is outmoded and outdated. Harrington, reporting the cases of mammary cancer at the Mayo Clinic, expressed the opinion that irradiation adds nothing of value to the surgical treatment of mammary cancer. He definitely states, however, that the group with lymph node involvement shows 4.8 per cent better results with than without irradiation.

Preoperative Irradiation. — Many therapists believe that preoperative irradiation is of most value in breast malignancies. This opinion is based on the direct action of irradiation on the malignant cells, which are either killed outright or hindered in their growth. It has been shown time and again that growing malignant cells are most vulnerable to roentgen therapy and also that it stimulates the defensive process of the normal tissues, thereby inhibiting extension and further growth of malignant cells. It likewise definitely limits growth of tumors to the tissue already involved. Regarding preoperative irradiation, Bloodgood states that in no case has it lessened the chances of a permanent cure by operation. He also advocates that if preoperative irradiation is selected it should be of the same intensity and the same duration as in inoperable cancer of the breast.

Irradiation in Advanced Carcinoma of the Breast.—The radiation therapist must be a physician consultant with a special knowledge of the biophysics and pathology, never forgetting his province in the cure of the disease, in the sense of "curare," meaning to "take care of." The true physician should have the same consideration and the same interest in palliating the advanced cancer patient, as far as possible, as he does the advanced heart case. Certainly no conscientious physician would tell a patient suffering with pain from a peptic ulcer that he will do as well without treatment even though that be entirely correct in so far as statistical cure is concerned.

In carcinoma of the breast, metastasis in the distant regions (lymph nodes, lungs, skeleton, liver) appears frequently and early in the course of the disease. The systematic study of the lungs, mediastinum, pelvis and spine by x-ray in the search of metastasis is important as a preliminary to deciding on suitable treatment. The cases in which early metastatic death ensues following operation indicate that secondary cancer foci were overlooked or disregarded at the time of operation.

Various types of advanced cancer of the breast show different grades of malignancy, take a different clinical course, and require different types of treatment. In order to discuss briefly the therapeutic value of irradiation in advanced mammary cancer, it is best to classify the types into groups.

(1) Inoperable because of age and physical condition.

(2) Local recurrence after radical mastectomy.

(3) Extension to glands and attachment to chest wall.

(4) Generalized metastasis.

The chief object in palliation in the advanced cases of carcinoma of the breast should be the comfort of the patient. Each case therefore should be considered from the standpoint of the general condition of the patient, the possible duration of life, whether or not a slough is imminent, whether or not an immediate recurrence is likely, and with reference to the radiation sensitivity of the tumor. Many of these cases are so advanced that nothing of benefit can be done.

Since it has been definitely proven that irradiation will cure mammary cancer in its early stages, there should no longer be any hesitancy on the part of the surgeon or internist in referring to a competent radiation therapist those cases that are inoperable because of the general physical condition of the patient such as age, debility or severe cardiac, renal, pulmonary or associated lesions. In these cases irradiation may be substituted for radical mastectomy with excellent results.

Regarding local recurrences, Harrington is of the opinion that secondary operations accomplish little or nothing in these cases. Recurrent tumors are frequently attached to the chest wall and are best treated by irradiation. The results are reasonably satisfactory, because when there has been extension into the supraclavicular, infraclavicular or parasternal lymph nodes, the chances of a cure are small. The aim of irradia-

tion is to create a comfortable and, as far as possible, a useful life. We know that irradiation has lessened pain and distress, has retarded metastatic growth, and in innumerable cases has destroyed superficial recurrences.

Offering palliation in the group of cases with generalized metastasis is often disappointing. The life of a patient with pulmonary metastasis secondary to carcinoma of the breast is short and extremely uncomfortable. Irradiation in these cases nevertheless is worthy of a trial, because these secondary pulmonary lesions not infrequently show marked benefit and retrogression of metastasis.

Most remarkable results from irradiation therapy are obtained frequently in the treatment of skeletal metastasis of carcinoma of the breast. Any attempt to cure metastatic lesions to the osseous system is absurd, but palliation such as relief of pain and distress are obtained in a high percentage of cases.

In cases of osseous metastasis secondary to mammary cancer, ovarian irradiation has been substituted in recent years for the ancient custom of surgical removal of the ovaries with excellent results. In this connection Quick concludes:

"While the ovarian hormone evidently exerts an influence on the development of some breast cancers, there is no substantial evidence to warrant castration by irradiation as a therapeutic aid."

Recent improvements in the results of the treatment of mammary cancer by irradiation may be attributed primarily to change in technic, combined with a better physical and biological knowledge of the factors involved secondarily to improvement in apparatus and equipment.

During recent years mammary cancer has received the attention of many outstanding writers and it is apparent that many surgeons have had a change of attitude toward agencies other than surgery. Although there remains a division of opinion among many well informed surgeons and radiologists, those conversant with the situation are satisfied that when primary breast tumors have been treated by the skillful and intelligent use of irradiation as the method of choice, the results will compare favorably with any other type of treatment.

In 1928 Ewing stated:

"On account of the extremely variable clinical and anatomical characteristics of the disease, the difficulties of diagnosis, the danger of dissemination of the disease by surgical manipulation, the extent of the radical operation, and the frequency of recurrence, irradiation therapy is destined largely to replace the surgery of mammary cancer."

Further advances in the treatment of breast cancer will come by combining pre- and postoperative external irradiation with operation, or by employing irradiation in selected cases as an alternative to operation.

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DISCUSSION (*Abstract*)

Dr. J. M. Martin, Dallas, Tex.—For many years surgery had the field of cancer of the breast completely under its domination. Aside from the operative mortality, the number of five-year cures in any large unselected group of cases has not been impressive. It should also be remembered that many of the successfully operated cases suffer from scars and various degrees of edema of the arms for which there is little permanent relief.

Women with cancer of the breast frequently refuse operation because of the distressing postoperative symptoms often observed among their friends. The statistics for five-year cures for operated cases of cancer of the breast with postoperative radiation quoted by the essayist are rather higher than we have heretofore observed in our own and other clinics.

Quite a radical change has been made in the last few years with regard to the technic in radiation therapy. In line with what Regaud taught, that is, the interstitial use of small amounts of highly filtered radium over long periods of time, Coutard has developed a technic in which he uses divided doses of highly filtered x-rays repeated every day for 12 to 20 or more days, thereby delivering very large doses without doing damage to normal tissue.

During a recent visit by one of us (Dr. C. L.) to the Memorial Hospital of New York and to the Garfield Hospital, Washington, District of Columbia, where breast cancer is being treated by various modifications of the Coutard technic, we were favorably impressed with the possibilities of this method. From our own experience with similar technics, supported by the work of other radiologists, we are of the opinion that breast cancer, together with the glands in the axillary region, even in the early or the so-called operative stages, should first be treated with intensive radiation, using several ports of entry, reaching the breast tumor from all available directions. In this way 4 or 5 ports of entry may be selected, the immediate overlying skin may be protected and the lesion given an intensive, highly filtered radiation that will, in the majority of cases, tend to destroy the cancer cells.

The implantation of weak radium platinum needles of suitable length around and under the breast tumor for seven or eight days, as recommended by Keyes, has been used by us with promising results.

When radiation fails completely to reduce the tumor, surgery may be used to remove the greatly fibrosed malignant process.

In the treatment of cancer of the breast primarily by radiation, the treatment mortality is negative, the deformity is slight, the complications are few, the stay in the hospital is short and we believe the final results will be better than those produced by surgery alone or surgery and postoperative radiation.

Dr. J. Cash King, Memphis, Tenn.—It is possible that at some time in the future the treatment of mammary carcinoma will fall upon the shoulders of radiologists, that is to say, the use of x-ray and radium may be the treatment of choice in all malignancies of this portion of the anatomy. However, this time is well in the future. At present it behooves the radiologist to cooperate wholeheartedly with the surgical profession in order that the benefits of irradiation may become established and better understood by those consulted by patients suffering from this disease.

Dr. Giles has asked me to discuss the principles and advantages of preoperative irradiation. The mammary glands, in comparison with other portions of the body where grave malignant disease occurs, offer several advantages for therapy by irradiation. First, the gland is superficial enough to permit a tumor dose of irradiation almost equal to that of the skin dose, even when external (x-ray) irradiation alone is used. Second, it permits accurate placing of interstitial irradiation. Third, sloughing seldom occurs. Fourth, loss of the mammary gland *per se* is relatively unimportant. Fifth, there is no contraindication to surgical removal at a later date if necessary. However, let me hasten to add that the mammary gland that harbors malignant cells also offers handicaps that are worthy of serious consideration by the radiologist. The most important of these is, that the gland tissue is enveloped by fatty tissue which is an extremely poor reactive tissue for irradiation.

During the last year at the Memphis General Hospital, we have given preoperative irradiation in 37 cases of carcinoma of the breast. The following routine was used by our cancer service. A total of 2,000 to 3,000 roentgens with an average of 2,400 were given each case. For this dose three portals were used, each directed at a tangent to the thorax and through the breast medially, laterally and superiorly, respectively. Recently we are using larger doses. In addition to this, the axilla and supraclavicular space was treated in all cases. During the second week after irradiation was completed, a radical breast operation was performed. One course of postoperative therapy of 2,000 accumulative dose was given six weeks after operation. The benefits that we have noted in this one year of experience have been: (1) regression in the size and tenseness of the tumefaction (often times quite marked and beginning within a few days). (2) Lessening of the pain and toxicity. (3) The tumor becomes better defined. (4) Many of those that were fixed to the deeper parts become mobile after regression has occurred. (5) In brief, it appeared that many of the highly malignant, rapidly growing tumors were temporarily converted into regressive ones.

Interstitial radium was inserted in the axilla and infraclavicular regions at the time of operation in all cases that were moderately advanced. We have been very favorably impressed with the results obtained in the short period of time, and the only change that we are making is an increase in the dose of preoperative x-ray therapy.

It is our belief that postoperative irradiation is imperative, but it is secondary in importance to preoperative irradiation.

THE MANAGEMENT OF ATROPHIC ARTHRITIS*

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When a patient consults his physician because of joint or muscle pains, it is of the greatest importance that an accurate diagnosis be made. This patient may be suffering from some trivial illness, or he may be in the early stages of a crippling disease. Septic joint, gout, neurotrophic arthropathies, Neisserian infection and rheumatic fever must be ruled out before a diagnosis of chronic non-specific arthritis is made. The differentiation in diagnosis is not generally difficult. It may be well to note, however, that it is not always possible to differentiate rheumatic fever from an acute atrophic arthritis in the early stages, although the course of the disease will soon make the diagnosis. It is well to note also that Neisserian infections may involve

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many small joints and more closely simulate an atrophic arthritis than is generally supposed. While it is true that a crippling arthritis will sooner or later become obvious, it is essential that it be identified early before deformity and joint destruction have begun.

There are several recognized types of non-specific arthritis, and once the diagnosis of non-specific arthritis is made it becomes necessary to classify the disease properly as to type.

It should be remembered that atrophic arthritis may be initiated with all the acuteness of rheumatic fever; indeed, at its onset differentiation is often impossible; or it may begin most insidiously, with very few symptoms. The course of the disease may vary from a rapidly progressing febrile and exceedingly severe illness, in which the patient becomes helpless almost immediately, to an afebrile illness with but little discomfort over a period of years, but which may just as certainly develop into a crippling deformity. Because of these widespread variations in onset and course, the treatment of atrophic arthritis must be considered in relation to the stage of the disease.

In order better to clarify our concepts of treatment, it must first be stated that the disease has not yet a proven specific etiological agent, nor is there a known specific cure. Many factors are concerned in the etiology of this disease. Heredity, infection, constitutional type, fatigue, exposure, nervous strain, gastro-intestinal dysfunction, circulatory disturbances and many other abnormalities serve not only as an adequate stage setting, but as the trigger mechanism which sets in motion the vicious cycle of this disease. It is because of this complex background and because the disease is not only one involving the joints, but a constitutional disease implicating almost every tissue in the body that the approach to therapy must be a very general one.

In a previous paper,* one of us (W. P. H.), reported carefully controlled experiments with various types of therapy. This consisted of placing approximately 400 patients with atrophic arthritis on a general program which included dietary correction, bowel management, prevention and correction of deformity, rest, exercise, general physiotherapy and climatic residence. After a control period of several months, 100 had foci of infection removed; 100 were given blood transfusions; 100 were given vaccine of various types, and 100 were given special forms of heliotherapy. Progress was observed over periods ranging from months to years. The results of this study emphasized the non-specificity of any single therapeutic agent used, and the necessity of using a comprehensive program of management. Regardless of our present lack of a specific cure, there are a number of simple, fundamental procedures which have not been sufficiently emphasized but which are vitally essential to the management of these arthritic patients. It is our purpose in this paper to illustrate briefly the simple methods that can be followed in preventing these patients from becoming hopeless cripples.

When a patient presents himself for treatment, it becomes essential to devise an ideal program and this must be done for each patient individually. Because of the wide variation in the severity of symptoms and the difficulty of determining at once the phase of the disease, we have adopted a plan of treating each new patient as an acute case, and then as rapidly as possible advancing him to the stage of activity for which he is ready. This will mean a few weeks of bed rest for patients who have been quite active, but it is a much safer procedure than permitting a patient activity for which he is not ready. We have found such a plan most satisfactory in treating many hundreds of these arthritic patients.

We are asked from time to time just what, besides climate, we employ in the treatment of our patients in Tucson. Before discussing the various therapeutic procedures abstractly, as a more pointed method of exposition we should like to present the case history of a patient with a typical atrophic arthritis, indicating the exact therapeutic measures used during the different phases of the disease.

CASE HISTORY

A man of 58 complained of pain in and swelling and deformity of hands, wrists, knees and ankles, and pain in and limitation of the left hip, shoulders and the neck. The patient was almost entirely helpless, unable to feed himself or to get off the bed. Duration of the condition was one year.

His weight loss was thirty pounds.

Positive findings of the physical examination were:

(1) There was marked limitation of motion in the joints mentioned, several showing effusions. One joint was red and hot. There was flexion contraction of both knees and wrists.

*Holbrook, W. Paul: Evaluation of Therapy in Chronic Atrophic Arthritis. Ann. Int. Med., 7: (O.S. Vol. XII), No. 4, Oct., 1933.

(2) Malnutrition.

(3) Fever, 100 to 100.5° F. daily (fever denied by patient).

(4) Anemia.

(5) Irritable bowel, with constipation.

(6) Foci of infection: dental sepsis and chronic cholecystitis.

Laboratory examination showed:

(1) Red blood cells 4,000,000 per cu. mm.

(2) Hemoglobin, 75 per cent (Sahli).

(3) White cells, 14,000. Schilling 0/0/0/83.5; monocytes, 2; lymphocytes, 14.

(4) Sedimentation of the red cells, 77 mm. in one hour. Temperature 21° (Westergren).

(5) Stool alkaline.

(6) Gastric analysis: free hydrochloric acid absent.

X-ray examination showed:

(1) Marked demineralization of bones in the hands, knees, pelvis, feet and cervical spine.

(2) Cartilage destruction of the knees and between the tarsal bones.

(3) Diverticulosis of the sigmoid with spasm.

(4) Thickened, poorly functioning gallbladder.

Treatment in the acute phase consisted of:

(1) Bed rest.

(2) Plaster shells to correct flexion contraction of knees and prevent muscle spasm.

(3) Cock-up splints for wrists.

(4) Firm, non-sagging bed.

(5) Semi-bland, high caloric, high vitamin diet.

(6) Dilute hydrochloric acid, one teaspoonful with meals.

(7) Lactic acid emulsified in agar and mineral oil, two ounces every night. Abdominal massage before stool time.

(8) Hot wet packs to the abdomen after meals.

(9) Tincture of belladonna to tolerance, three times daily.

(10) Corrective exercises: every joint assisted through its full range of painless motion daily; postural position; abdominal and breathing exercises; group muscle exercises without joint motion.

(11) Salicylates for relief of pain.

(12) No heat. No massage except skin friction.

(13) Four blood transfusions (following control period of eight weeks' continuous fever) of 250 c. c. each.

(14) General climatic advantage and graduated air baths.

At the end of three and one-half months, the patient had gained 17 pounds, had a normal temperature, and had very little spontaneous pain. His hemoglobin had risen from 75 to 90 per cent and the sedimentation rate had dropped from 77 to 35 mm. The routine was changed and the following orders were given:

(1) Change of diet to one limiting concentrated starches. Addition of large amounts of green vegetables and fruits.

(2) Light massage, gradually increasing, avoiding the joints.

(3) Group muscle exercises. Increase of active corrective exercises, assisting only when necessary; full range daily. Stress on patellar pull and foot exercises. Continuation of posture, breathing and abdominal exercises.

(4) Cautious application of heat to joints and muscles (no diathermy).

(5) Heliotherapy, general and local, cautiously and under close supervision.

(6) Water (pool) exercises. Water walking.

(7) Contrast baths to hands and feet.

(8) Dental extractions.

After eight months, the patient had gained 25 pounds. His hemoglobin was up to 100 per cent and sedimentation rate had dropped to 20 mm. The knees were straight. He was able to move nearly all of his joints actively through a fair range. He was then placed under the following routine:

(1) Allowed to stand on his feet with:
   (a) Corrective shoes with supports.
   (b) Horseshoe pads and ace bandages to the knees.
   (c) Crutches.
   (d) Calipers for a short time (not often necessary).

(2) He was carefully instructed in correct posture and the use of crutches as walking was begun.

(3) He was allowed progressive increase in all corrective exercises and gradual increase in walking.

After fourteen months the weight gain was maintained. The sedimentation rate was down to 6 mm. The patient was walking freely with a cane. He returned to his home in a mid-Western city.

The patient was re-examined after a period of thirteen months of full business activity. There were no sequelae except deformity of one finger. There had been no return of symptoms. Treatment now consists of regular hours, Saturday and Sunday rest, full corrective diet, bowel regulation and corrective exercises. The remaining foci of infection (gallbladder and bowel) were treated conservatively. Following general recovery, the gallbladder findings returned to normal by x-ray and clinical standards.

This is an average case history, showing the management of an unquestionable atrophic arthritis through the various phases. This patient made a recovery in approximately fourteen months. Some patients respond more rapidly to treatment and others much more slowly. Occasionally the disease remains progressive for years in spite of treatment. A very chronic case of several years' duration will usually respond to this same routine, but more slowly. Patience and effort will often accomplish a happy result in spite of the most hopeless outlook.

Some of the various efficacious therapeutic procedures will now be discussed briefly.

General.—Constitutional management of atrophic arthritis must include a general program that will aid in combating the disease by treating the patient both physically and mentally. It is exceedingly common to find that before the onset of arthritis there has been a history

of increasing business or domestic troubles, nervous strain or shock, overwork, irregular hours, constipation, loss of weight and many other factors that are not conducive to good health. In view of such a history, the treatment at the onset or in the first phase of the disease should be directed toward establishing a correct routine of living. This will require partial or total elimination of business or domestic responsibilities, avoidance of conditions producing nervous strain, and the establishing of regular hours, all in addition, of course, to the correction of the many physical defects likely to be present. If it is possible at the onset of the disease to isolate the patient from his family and business responsibilities, he will do better and this will save time in effecting a cure.

One of the first essentials in treating a patient with atrophic arthritis is a complete understanding between patient and physician, for it is only with the patient's understanding and cooperation through such a long and chronic illness that one can hope for any degree of success. Each patient should be told honestly what the problem of adequate treatment includes, and that there is no easy cure. Unfortunately, arthritis is usually chronic, often lasting many years and ultimately, if not treated, ending in crippling deformity. Regardless of treatment, there may be occasional recurring periods of exacerbation and remission. With such a disease it is only natural that most patients become pessimistic and discouraged. When a focus of infection is not found, or if the patient does not secure the improvement expected after removal of infection, he often becomes discouraged and thinks his disease is incurable. It must be remembered that many patients have gotten well when no infection was found, or in spite of remaining foci of infection.

Diet and Nutrition.—Atrophic arthritis in our experience calls for no special dietary restrictions outside the patient's general requirements of nutrition. If he is underweight, a well balanced high calorie diet should be given in sufficient quantity to restore him to normal weight. The diet then is advantageously changed to one low in concentrated starches and high in green vegetables, fruits and other vitamin-containing foods. Additional vitamins are given in the form of wheat germ and cod liver oil.

Bowel Management.—Cathartics are best avoided, and it is usually possible, by proper abdominal exercises, abdominal massage, habit time, and the use of a simple lubricant to establish adequate intestinal elimination.

Prevention and Correction of Deformity.—In every patient with atrophic arthritis, the possibility of residual deformity in any or all involved joints should be anticipated. The prevention of such deformities can be accomplished only at the price of eternal vigilance, and their correction requires infinite patience. If the patient is seen sufficiently early in the disease, the problem will be one of prevention only. The chief deformities occur in flexion, particularly in the knees, hips, elbows, wrists, hands and spine. Unfortunately, the patient usually develops the worst possible bodily position and postures. He lies on a bed that sags, placing pillows under his knees and head. The hands, wrists and elbows lie flexed across the body. Thus, deformity begins. More than 80 per cent of all patients entering our clinic with chronic arthritis have a flexion deformity of one or more joints which could have been prevented.

The first corrective requirement is a hard bed that does not sag. The patient during the day must spend several periods on this bed, without pillows, and with all joints fully extended. If pain and muscle spasm interfere, plaster shells for the knees should be used as well as splints for painful joints, such as cock-up splints for the wrists. Chest, abdominal and postural exercises are invaluable at this stage of the disease. Assistive exercises, which move every joint through its full range of painless motion at least once daily, should be begun early. Group muscle exercises, particularly of the extensors, such as the patellar pull, should be begun even before any joint motion is possible. As active inflammation subsides, exercises should be active and not passive, becoming increasingly strenuous. It is entirely possible in the treatment of this disease for the patient to attain the muscular development of an athlete by bed exercises alone. It is essential that posture be correct, the knees straight, and that sufficient muscle strength be developed before the patient is allowed to begin walking. When walking is first attempted, properly fitted shoes with good arch supports, horseshoe pads and ace bandages to the knees, and a pair of crutches properly used will help the patient to succeed. Otherwise, he may be forced to return to his bed in disappointment. It is especially important in the early stages of the disease that no weight be borne on a bent or painful knee. Such weight-bearing only re-

sults in further damage to inflamed joint structures and is often the cause of irreparable damage.

General Physiotherapy.—The local application of heat to the joints is a much abused therapeutic procedure. Heat to the joints should not be utilized early in the disease, as such treatment is often responsible for prolonging an active process which might otherwise subside. Application of heat should not be used in the acute stage when there is heat or redness in the joint, and, furthermore, it should be begun very cautiously in the early chronic stage of the disease. Heat to muscles often relieves pain and may be used cautiously in early stages. We feel that diathermy is usually harmful when used in the presence of the marked demineralization of bones which is usually present in atrophic arthritis. We reserve diathermy for use in hypertrophic arthritis. Contrast baths to the hands and feet are especially useful in the presence of cold, clammy and wet extremities. The dry, aching joint or extremity responds well to hot paraffin packs. Cold Epsom salts packs will often reduce pain in the acute stages, while hot Epsom salts packs or hot salt and sand packs are useful in the chronic stages. In addition, the large salt and sand pack, because of its weight and heat, may assist in correcting a slight residual flexion contraction of the knee. The induction of fever, either by diathermy or cabinet baths, has not been especially successful in our experience.

Removal of Foci of Infection.—Removal of foci of infection should be considered with regard to the particular phase of the disease. If this removal is to be of any benefit, it should be accomplished early in the course of the disease, although it is exactly at this phase that such a procedure is most hazardous. We have observed a large number of patients who had a definite spread of their disease, with acute exacerbations, following removal of foci of infection. A patient in the early stages of atrophic arthritis usually has a history of fatigue, nervous exhaustion, constipation and malnutrition. It seems only reasonable that a fair attempt should be made to correct these factors which have made the development of the arthritis possible before risking the surgical insult associated with radical removal of foci of infection. Such a patient should be treated for a reasonable length of time in an attempt to lessen the severity of the disease and improve him constitutionally, and then under the best possible conditions foci of infection may be removed. Certainly, in a severe case where the patient is undernourished, fatigued and nervously exhausted, there is a very great hazard in immediate removal of foci. When foci of infection in teeth or tonsils are removed, the infection itself is not removed at once, but continues to invade the lymph nodes and tissues about the focus. Absorption is actually increased for a time before the desired results are effected. Frequently we precede the removal of foci by a blood transfusion, taking particular care not to remove a focus during or near an acute phase of the disease. Since following this plan, we have seen few unfavorable reactions following removal of foci of infection. If removal of foci is undertaken in the very chronic afebrile cases with advanced joint changes, this procedure should be followed because of general health considerations and not with the hope of curing the disease.

Vaccines.—We have given vaccines to patients with atrophic arthritis, using autogenous and stock antigens by the intravenous and subcutaneous routes. Evaluation of therapy in atrophic arthritis is at best most difficult. In comparing groups of patients receiving vaccine with control groups not receiving vaccine, no striking difference in results was noted. We have had some favorable results in the subacute phase of the disease by giving, intravenously, minute doses of antigen to which the patient was strongly skin sensitive. Non-specific protein shock therapy, or marked reactions from vaccines of any kind, are occasionally responsible for exacerbations of the disease. Particularly are such measures to be condemned in the subacute phase of the disease. In our present state of knowledge, we are continuing to use vaccine in selected cases, but feel that it has a limited value; it is not a panacea and should be used only as an adjunct in treatment, and then only where complete facilities are available for following the patient under experienced medical direction. We condemn the indiscriminate use of vaccine because its use as a specific results in the neglect of the basic constitutional management essential in the treatment of every patient with atrophic arthritis.

Blood Transfusions.—Patients with fever in the acute or subacute phases of atrophic arthritis, with or without anemia, respond well and occasionally dramatically to a series of small blood transfusions. Transfusion has been of lit-

tle help in the very chronic afebrile patients with far advanced joint changes.

Climate.—Of the many climatic components, sun radiation is that over which we have most control. Heliotherapy in various forms has an important place in treatment, but it must be given judiciously under proper supervision. In the active phase of the disease or in the presence of fever, it is usually over-stimulating and causes an increase in fever and pulse rate, sometimes producing dizziness, nausea and vomiting. When acute, the disease is best treated by air baths or exposure to sky shine. When the disease is less active, general sun exposure is commenced for one minute, front and back, or by the Rollier technic. The exposure is then gradually increased, temperature and pulse being watched periodically to note and prevent reactions. Tolerance varies not only with the phase of the disease, but with the individual, so that exposures may run from several minutes to an hour or two.

The exact nature of the physiological response to heliotherapy is not as yet clearly understood. Symptomatically, the patient notices a general tonic effect, with marked relief from aching and muscle spasm. Circulation is improved and the extremities become warm and lose the characteristic clammy feeling. The hemoglobin and red blood cells are increased.

It must be understood, however, that, without a proper routine of living, arthritis, even on the Tucson desert, can continue as a sad and crippling disease. Unfortunately, many people come to the Southwest believing that climate performs miracles and with the idea that a month or so in the Arizona sun will cure them. These individuals, if not put under supervision, often get an unfavorable and sometimes serious sun reaction from over-exposure.

SUMMARY

(1) A brief discussion of the management of atrophic arthritis is presented with a typical case history, showing the variations in treatment during the different phases of the disease.

(2) In spite of the absence of a specific etiological agent or a specific cure for the disease, the widespread pessimistic attitude regarding treatment is not warranted. A thorough understanding with the patient and an approach to his problem as a constitutional disease will prevent deformity and restore the great majority of these unhappy people to a useful life.

DISCUSSION (*Abstract*)

Dr. J. F. Hamilton, Memphis, Tenn.—Although Dr. Holbrook has obtained good results in his work, the problem of the arthritic is by no means settled.

What would be the condition sociologically and economically today of the victim of tuberculosis if the problem of tuberculosis were still being attacked as the arthritis problem is being attacked today? There can be but one answer, that little or no real progress would have been made. Before great good can come to the unfortunate victim of atrophic arthritis the problem must have the support of the general public through a Federal, state or municipal agency.

Dr. W. T. Wootton, Hot Springs, Ark.—Doing allergic tests as a routine on all patients complaining of joint pain or swelling has enabled us to pick up a complicating factor in many cases, and the sole cause in many others. I should now as soon omit a blood Wassermann, blood count or urinary examination, in a routine study, as to omit the allergic study.

In Hot Springs, we believe that the resultant good effects of applied heat are due to the fact that we get a general production of heat, an increased metabolic rate, through the use of our natural hot water. We cannot get this by using artificially heated water. The local application of heat in any form has not given us as satisfactory results as has the stimulation of the metabolic rate with a prolonged rise in body temperature that we get from the Hot Springs baths.

Dr. Hugh J. Morgan, Nashville, Tenn.—I should like Dr. Holbrook to give us his ideas as to the effect of climatological factors on arthritis.

Dr. W. R. Houston, Augusta, Ga.—The treatment of chronic arthritis has suffered from several mistakes in emphasis. The most prominent among these at the moment is the over-emphasis on the removal of foci of infection. This procedure, undoubtedly useful in some cases, when undertaken early has often been made the sole therapeutic effort, to the neglect of the general principles of care for rest, diet, upbuilding that are appropriate for patients who suffer from chronic inflammation and infection. A second mistake has been failure to utilize sufficiently methods of physical therapy and it is largely due to this neglect that cults emphasizing physical therapy have gained a large following.

A considerable group of therapeutic efforts employed in chronic arthritis may be designated as what the Germans call *umstimmung* therapy. The word *umstimmung*, literally, re-tuning, comprises various forms of shock therapy, non-specific protein therapy, fever therapy, therapy by the injection and inunction of heavy metals, or of sulphur and the like. The word *umstimmung* has a significance that etiologically is similar to that of our word alterative, a word of vary vague meaning, one which is commonly applied to arsenic,

and it may be remarked that arsenic is considered by Pemberton to be the best of all medicines for arthritics.

I should like to call your attention to a very simple, harmless and inexpensive means of employing *umstimmung* therapy in the form of fever. This is by the use of hot baths. Some years ago at our Hot Springs meeting a local physician expressed the opinion that after taking the baths there the temperature usually reached 101° F. and this rise, he thought, was to be ascribed to radioactivity of the water. Physiologists have now shown that any water of the same temperature will produce the same fever. A bath of fifteen or twenty minutes in water at 104° will produce a rise of several degrees in the body temperature. I feel no doubt that the unquestionable benefits attained by arthritics at Hot Springs have been in great measure due to the mild fever therapy. When the baths are given at home, followed by a sweat with hot blankets, results that are striking can often be obtained, results comparable in every way with those gotten by more expensive and spectacular methods.

Dr. Holbrook (closing).—Dr. Hamilton's suggestion that patients with arthritis be cared for under much the same scheme as those with tuberculosis is worthy of a great deal of emphasis. Rheumatic disease is causing at present more disability than all forms of tuberculosis and cancer combined. The problem will not be settled for a large number of patients until some such scheme is put into practice.

I am somewhat surprised at the emphasis placed on the allergic factor in chronic arthritis by Dr. Wootton. Our experience has led us to believe that patients with chronic arthritis are notoriously low reactors. I think it is true that a number of them possess a degree of bacterial hypersensitivity, but so far as the general evidences of allergy are concerned they are usually strikingly absent in patients with chronic atrophic arthritis.

Dr. Morgan has asked for an opinion on the effect of climatological factors on arthritis. This is a long and difficult question to answer in closing the discussion. We do feel, however, because of the geographical incidence of the disease, its rarity among native whites and Indians on the Tucson desert, and the marked beneficial effects experienced in treating many cases of the disease in a satisfactory climate, that climatological factors play a definite role in the etiology and treatment of this disease. It is difficult to evaluate the exact meteorological conditions which are responsible for climate. Certain patients with rheumatic disease are sensitive to humidity, others to barometric change, and still others to wind. There is no doubt that patients in general do better in sunshine, warmth and dryness.

Dr. Houston has wisely pointed out the dangers of over-emphasis on the removal of foci of infection.

In closing, we should like to emphasize the necessity of the early recognition of the disease and to point out that a broad, comprehensive approach to the problem will in almost every instance prevent crippling deformity and will also return a very large number of these otherwise helpless people to useful lives.

THE INFLUENCE OF EARLY THERAPY ON THE INCUBATION PERIOD OF SYPHILIS*

By THOMAS B. HALL, M.D.,
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The incubation period of neurosyphilis is a term first used by Rivaut to designate the time elapsing from the date syphilis was contracted to the onset of neurological symptoms.

We shall apply the term "incubation period" in the same manner to both neurosyphilis and other late manifestations of syphilis, such as aortitis and gumma of the skin.

The statistical approach in the evaluation of the effect of therapy on syphilis may be used in two ways.

The ideal procedure is admittedly the "follow-up" method. Certain objections and difficulties are, however, at once encountered in the application of this method. It is extremely difficult to follow up any large number of syphilitics over the long time necessary to evaluate the final effects of therapy on the course of syphilis. Inasmuch as it is well recognized that untreated syphilitics not infrequently carry their infection for many years (10 to 40) with a remarkable degree of latency, the difficulties of the long observations necessary in the "follow-up" method are at once apparent.

The other method of approach is to obtain the histories of patients showing manifestations from the effects of late syphilis. Certain objections are also evident in using this method. The patient is often unable to give exact information as to the date of infection, and the amount of therapy which he has had.

Many cases of central nervous system syphilis are so mentally deteriorated that a history is unobtainable. However, it can be assumed that the average patient, who admits that he has had syphilis, will do all he can to cooperate in giving as complete a history as possible in regard to his previous therapy.

The advantage of this method of approach is that we are able to adjudge the effect of therapy

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*From the Department of Dermatology and Syphilology of the Kansas City General Hospital, C. C. Dennie, Director of the Department.

over a time interval of decades, rather than a few years. This is highly desirable in a disease of such great chronicity as syphilis.

At a time when numerous surveys have shown the tendency of inadequate modern therapy to shorten the incubation period of neurosyphilis, it is desirable that an effort be made to evaluate the factor or factors in modern therapy which are responsible for this highly undesirable result.

H. Hopkins says:

"A number of German and French syphilologists have shown that the incubation period of tabes and dementia paralytica is markedly influenced by treatment for early syphilis, and that such treatment, whether consisting of the administration of preparations of mercury or arsphenamine, tends to shorten the incubation period."

The same writer, in a study of 504 cases of central nervous system syphilis, found that the incubation period of all types of neurosyphilis was shorter in that group of patients who received treatment during the early stage or subsequent course of their infection.

In his treated group, he included those who had had previous antisyphilitic treatment with mercury or arsenic or both.

One-fourth of his treated group had received a year of treatment during the early stage or subsequent course of their infection. Hopkins has considered his treated group as a whole and not divided his treated cases into sub-groups. Thus, no distinction is made between those who received mercury alone, arsphenamines alone, or combined mercury and arsphenamine therapy.

By dividing the cases of late syphilis in this series into groups according to the treatment received during the early course of their syphilis, we have attempted to secure information as to the factor or factors which are responsible for a decrease in the incubation period of neurosyphilis and other types of syphilis.

Since the inauguration of the arsphenamines in the therapy of syphilis, comparatively few patients have been treated with mercury alone.

Inasmuch as two and one-half decades have elapsed since arsphenamine was introduced, it is obvious that the number of patients who have received mercury alone has been constantly fewer.

That even at present we are seeing numerous patients who give a history of having had prolonged treatment with mercury alone in the early stages of syphilis is a striking tribute to the effectiveness of mercury.

In this series of cases, obtained by a review of all cases of syphilis admitted to the hospital and outpatient department of the Kansas City General Hospital between the years 1922-1934, only patients with late syphilis (two years and over) were included, who gave a definite history of chancre or secondaries, and in whom the approximate amount of therapy or absence of any therapy during the acute stage of syphilis, was recorded.

From a review of 4,258 cases only 191 cases fulfilled the above requirements. The reasons for obtaining such a comparatively small number of cases which fulfilled our requirements are several.

Approximately 50 per cent represented acute early syphilis and were at once excluded. The fact that the majority of women are unable to tell when they have acquired syphilis excluded another large number. Many were mental cases, from whom a history was unobtainable.

The failure of another large number of cases to meet our requirements may be laid to the door of incomplete history-taking. Such notations on a history as "Patient admits he contracted syphilis years ago," or "Patient took some shots 12 years ago," are obviously of no value in arriving at anything approaching a definite conclusion as to when the patient acquired syphilis or as to what amount of therapy he has had.

I feel that if the histories had been uniformly inquired into and recorded our series of acceptable cases would be several times larger than it is.

In our series of 191 cases there were 185 men and 6 women. The small number of women included in this series is explicable by the well-known facts that the majority of women are unable to give exact information as to when they acquired syphilis and by the comparative freedom of the female from the late degenerative effects of syphilis.

This series included 35 cases of paresis, 60 cases of tabes dorsalis, 8 cases of the tabetic type of dementia paralytica, 17 cases of late skin syphilis, 18 cases of cardiovascular syphilis, 5 cases of bone syphilis, and 8 cases of late syphilis, showing only a positive serology. Included also are 11 cases of various types of syphilis consisting of 5 cases of leukoplakia, 2 cases of keratitis, 1 case of pulmonary syphilis, 1 case of late iritis, 1 case of hepatic cirrhosis, and 1 case of adenitis.

The years 1884 and 1929 represent the ex-

tremes in years when syphilis was acquired. The minimum duration of infection was 2 years and the maximum duration 45 years. Ninety-three cases received some treatment in the early course of their syphilis; 98 received no treatment during the early course of their infection. The average duration of the infection in the 191 cases was 18.3 years. The average duration of the infection in 93 cases treated at the same time they acquired syphilis was 16.4 years. The average duration of infection in 98 cases of untreated syphilis was 19 years.

The therapy received in the 93 treated cases was divided into three groups. Group 1 included those who received mercury alone during the early stages of the disease. Group 2 included those who received arsphenamine alone during the early stage of the disease. Group 3 included those who received both arsphenamine and mercury during the early course of their infection.

The accompanying table will show the incubation period in the various types of late syphilis, according to the treatment received, during the early stage of the disease.

DISCUSSION

H. Hopkins, Weatherby, Healy, Sezary and others have shown that inadequate modern therapy tends to shorten the incubation period of neurosyphilis. The statement has been made that the incubation period of neurosyphilis is shortened by the treatment of early syphilis with either the arsphenamine or mercury. Our findings as to the influence of inadequate modern therapy, using the term modern to designate arsphenamine therapy, or combined arsphenamine and mercury therapy, on the incubation period of neurosyphilis, are in accord with the findings of Hopkins and others.

Thus, the average incubation period of 67 cases of neurosyphilis receiving no treatment during the early phase of syphilis was 20.43 years as compared to an average incubation period of 11.53 years in 41 cases of neurosyphilis receiving arsphenamine or arsphenamine and mercury treatment in the early course of infection.

In order to determine the factor in modern therapy which tends to shorten the incubation period of neurosyphilis and other forms of late syphilis, we here analyze the duration of the incubation period in accordance with the treatment received.

Our series of 24 cases of neurosyphilis treated by mercury alone gives little indication that mercury, when used alone in the early course of syphilis, shortens the incubation period of neurosyphilis.

In fact, the average incubation period (25.61 years) of all cases of neurosyphilis in patients who were treated by mercury alone in the early stage of their infection is greater than the incubation period in any other group of neurosyphilitics.

Only in the group of 8 cases of paresis was there any indication that mercury when used alone in the early stage of syphilis tends to shorten the incubation period.

The fact that our series shows that mercury, in general, when used alone, tends to lengthen rather than to decrease the incubation period in all other types of late syphilis, makes us believe that a larger survey would probably show

INCUBATION PERIOD OF SYPHILIS

	Mercury Alone	No Treatment	Arsphenamines Alone	Arsphenamines and Mercury
Paresis	8 cases—16 years	15 cases—20.14 years	9 cases—11.66 years	3 cases—14.66 years
Tabetic form of dementia paralytica	1 case—40 years	3 cases—17 years	7 cases—14 years	
Tabes dorsalis	13 cases—28.7 years	37 cases—21.35 years	4 cases—13 years	3 cases—15.33 years
Cerebrospinal	2 cases—36.5 years	12 cases—18.9 years	8 cases—8 years	7 cases—9.14 years
Cardiovascular	4 cases—23.25 years	12 cases—23.25 years	2 cases—17 years	
Skin	5 cases—30.2 years	6 cases—13.33 years	6 cases—6.8 years	
Bone		3 cases—19.66 years	1 case—4 years	1 case—3 years
Serological	1 case—4 years	4 cases—14.75 years	2 cases—5.5 years	1 case—2 years
Miscellaneous types of syphilis	4 cases—22.25 years	6 cases—23 years	1 case—2 years	
Total	38 cases	98 cases	40 cases	15 cases
Mean duration	25.05 years	20.25 years	10.25 years	10.6 years

that mercury, when used alone, would increase rather than decrease the incubation period of paresis. At least a much larger group of cases is necessary before we can evaluate the effect of mercury on the incubation period of paresis.

The average incubation period in neurosyphilis, not treated, was 20.43 years; in neurosyphilis treated by arsphenamine alone, 11.03 years; and in neurosyphilis treated by the arsphenamines and mercury both, 11.84 years.

In the group of 13 cases of neurosyphilis treated by arsphenamine and mercury, with an average incubation period of 11.84 years, 8 cases received such a small amount of mercury that we feel that these were influenced almost entirely by the arsphenamine, and should be included in that group.

Nine cases of late syphilis (all neurosyphilis except one) in patients who received little mercury and the arsphenamine had an average incubation period of 7.88 years. Six cases of late syphilis (all neurosyphilis except one), in patients who received much mercury and the arsphenamine, had an average incubation period of 14.66 years.

An incubation period of 7.88 years as compared to an incubation period of 14.66 years, is in accordance with the accepted knowledge that mercury, in a sufficient amount, when used in conjunction with the arsphenamines, tends to prevent the development of early involvement of the central nervous system and other types of precocious late involvement commonly encountered when the arsphenamines are used alone.

In 40 cases of late syphilis treated by the arsphenamines alone, the average number of injections of arsphenamine received during the early stage of the infection was 8.02 injections per case.

Twelve cases receiving over ten injections of the arsphenamines had an incubation period of 10.4 years. Twenty-eight cases receiving under ten injections had an incubation period of 10.25 years.

These figures would seem to indicate that an increase in the number of injections of the arsphenamines when used alone in early syphilis is not markedly conducive to an increase in the length of the incubation period.

In an effort to evaluate the effect of the amount of mercury, when used alone, during the early stage of syphilis, those cases of late syphilis in patients who were treated by mercury alone over 3 months and those treated by mercury alone under 3 months were placed in two groups.

In 33 cases of late syphilis treated during the early stage of the disease by the administration of mercury alone for a period of 3 months and over, the average incubation period was 26.25 years. In 5 cases of late syphilis, in which mercury alone was administered for under 3 months during the early stage of syphilis, the average incubation period was 17.2 years. In contradistinction to the effect of little or much arsphenamine, it would seem that the prolonged administration of mercury tends to lengthen the incubation period of late syphilis.

One hundred and three of the 191 cases in our series of late syphilis acquired the infection after 1910, the year in which the arsphenamines were introduced in treatment. Forty-six cases of the 103 received no treatment. The incubation period in this group was 11.77 years. Eight patients of the 103 who acquired their syphilis after 1910 were treated by mercury alone. The incubation period in this group was 12.75 years.

Forty cases of the 103 were treated by the arsphenamines alone, the average incubation period in this group being 10.25 years. Fifteen cases were treated by the arsphenamines and mercury, the incubation period being 10.6 years.

CONCLUSIONS

This survey indicates that inadequate modern therapy (using modern to imply the use of the arsenicals alone or arsenicals and mercury combined) in the early course of syphilis shortens the incubation period of neurosyphilis as well as the incubation period of all types of late syphilis.

Mercury, when used alone during the early course of syphilis, would seem to lengthen the incubation period of late syphilis in general.

This study would indicate that the use of the arsphenamines is probably solely responsible for a decrease in the incubation period of late syphilis.

Future studies should be concerned with the determination of the effects of the arsphenamines on the incubation period of syphilis, when combined with the use of mercury or bismuth,

over a prolonged period of time during the early stage and subsequent course of syphilis.

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DENGUE FEVER*

REPORT OF ONE HUNDRED CASES STUDIED AT JACKSON MEMORIAL HOSPITAL DURING THE MIAMI EPIDEMIC, 1934

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and
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The Miami epidemic of dengue fever in the summer of 1934 was utilized in an intensive study of 100 cases hospitalized at Jackson Memorial. In this study we have established a definite relationship between the prevalence of *Aedes Aegypti* and the occurrence of dengue fever; tabulated symptoms and physical findings with percentages of each; made an analysis of the laboratory work, especially the blood picture; endeavored to find some adequate therapeutic agent; transmitted the disease experimentally; and made special efforts at differential diagnosis.

Our findings differed somewhat from the textbook descriptions and from the findings described by Miller[1] in his study of one hundred cases and by Bensis[2] in his clinical study.

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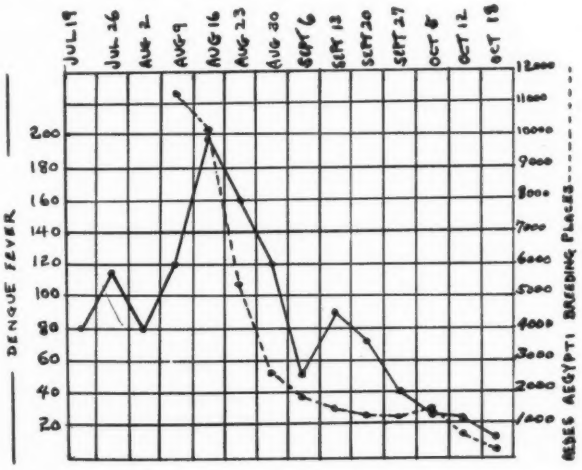

Chart 1

Relation of dengue incidence to breeding places of *Aedes Aegypti*. Solid line, dengue; dotted line, *Aedes Aegypti* breeding places.

ETIOLOGY AND TRANSMISSION

Craig and Ashburn[3] have conclusively proven that *Aedes Aegypti* is a vector. They also transmitted the disease with filtered serum.

We transmitted dengue in one instance with serum filtered through a Berkfeld filter. We also transmitted the disease, quite inadvertently, by transfusing a patient with a donor who developed dengue later. *Chart 1* shows the relationship between the number of breeding places of *Aedes Aegypti* and reported cases of dengue.

During the epidemic the Rockefeller Foundation sent a representative to Miami to secure blood specimens for study. In a communication to Miami's Public Health Department, Dr. W. A. Sawyer[5] states that dengue sera were injected into several types of monkeys, guinea pigs and other animals. The conclusions of Dr. Lloyd, who did the laboratory work, were that all of the animals used were resistant to dengue virus.

The Research Board of Manila,[3] in 1928, reported negative results with animal injections except for *Macacus fuscatus* and *M. philippinesis*. They were injected with dengue virus, which was transmitted from them via *Aedes Aegypti*.

IMMUNITY

In our series we observed very few patients who claimed to have had dengue previously. No reliable check could be made on this. We were unable to reinfect our experimentally produced case.

Simmons[6] states that experiments fail to show that the serum contains any specific, viricidal, precipitating or complement fixing antibodies. Yet Siler *et al.*[3] demonstrated immunity by attempts at reinfection.

Since immunity has been proven to exist, it seems logical to suppose that convalescent sera would be of prophylactic and therapeutic value, but experiments of the above men[3] proved otherwise. We used conva-

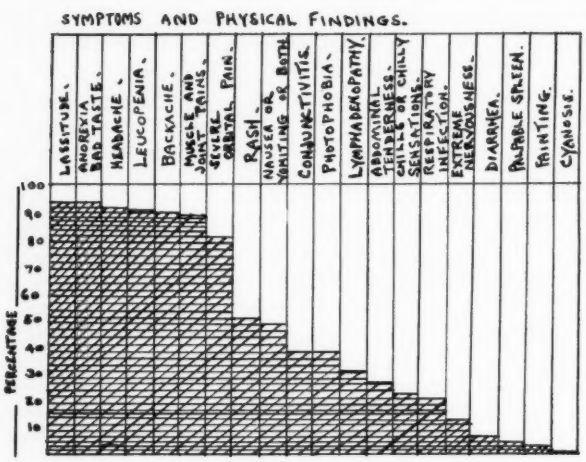

Chart 2
Symptoms and physical finding.

lescent blood intramuscularly, with no success. It is also logical to suppose that a skin test for dengue could be developed. We attempted this by using inactivated sera from known dengue cases; injected the serum intradermally on suspected dengue cases; accomplished nothing of value. An attempt at a precipitation test was made; this at first appeared successful, but was finally proven otherwise.

A vaccine prepared by Holt and St. John[7] in 1930 from the liver and spleen of *M. philippinesis* failed to immunize.

SYMPTOMS AND PHYSICAL FINDINGS

Chart 2 shows the symptoms and physical findings with percentages of each in 100 cases.

The majority of our cases were sudden in onset; ushered in, not infrequently, by chills, nausea, vomiting. Headache is very severe, orbital pain excruciating; backache, muscle and joint pains are marked. Anorexia, lassitude, bad taste and repulsion for cigarettes are extremely noticeable.

The rash (51 per cent in our series) is diffuse, maculo-papular, usually punctate and scarlatinoid, but sometimes morbilliform; affects most frequently the neck, chest, abdomen and arms. Itching is not marked; exfoliation rare. The eruption lasts typically two to three days; in some it is ephemeral, in some it lasts a week or more. We found convalescence to be very slow.

The patient lies very quietly and appears quite ill. A toxic, flushed appearance is the rule. Pressure on the eyeballs increases the orbital pain. Conjunctivitis and photophobia are frequently present. As a rule the reflexes are normal. The arterial tension is depressed.

The glandular adenophathy is most prevalent in the cervicals and epitrochlears; is more noticeable in children than in adults.

LABORATORY

The most noticeable deviation from normal in the laboratory findings is the granulocytopenia. From two to ten white cell counts were done on our series. There is an absolute decrease in the polymorphonuclears, a relative increase in the lymphocytes. The actual number of lymphocytes is unaltered. The Schilling differential reveals, of course, the marked diminution in polymorphonuclears; shows no increase in premature forms. A shift to the left observed by Simmons[3] did not occur in our series. Hence, there is seen to be a diminution in the number of granulocytes formed by the hematopoietic system. The granulocytes are, apparently, the only formed element of the hematopoietic system the manufacture of which undergoes a depression. The granulocytes show rather marked degenerative changes. Simmons[3]

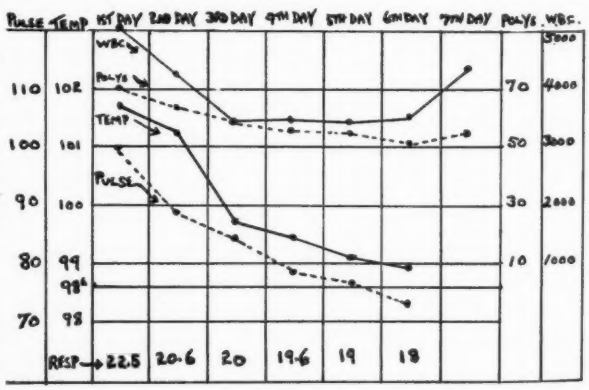

Chart 3
White cells, pulse and temperature, a composite graph of twenty cases of dengue hospitalized on date of onset.

suggests that perhaps the virus acts directly and selectively on the polymorphonuclear leukocytes.

White blood counts on 100 cases were as follows:

Lowest	1,100
Highest	7,500
Average	3,950

Red blood counts were normal.

The following were done on several cases and found to be normal:

Platelet count
Bleeding, coagulation and sedimentation time
Fragility test
Icteric index
Blood sugar
Blood cultures

The urine in the majority of cases was acid, contained a trace of albumin.

DIFFERENTIAL DIAGNOSIS

The chief conditions with which dengue might be confused, especially at first, are:

(1) Malaria
(2) Scarlatina and measles
(3) Influenza
(4) Typhoid fever and typhus fever
(5) Tetanus
(6) Encephalitis and meningitis
(7) Acute abdomen
(8) Agranulocytic angina

By referring to *Chart 2* it is seen that many cases have a tender abdomen with nausea and vomiting. A leukopenia does not rule out an acute abdomen. This fact was very emphatically demonstrated in one of our cases. A white female, 28, was treated outside the hospital for several days for dengue. She had the usual dengue picture, accompanied by nausea, vomiting, leukopenia. At the hospital a diagnosis of appendicitis was made. Surgical intervention revealed a ruptured appendix. A stormy postoperative course followed, culminating in a lethal exodus.

SEQUELAE, COMPLICATIONS

We saw several cases of bronchopneumonia subsequent to an attack of dengue. There were several fatalities in this group. Especially interesting was one of these fatal cases in that the patient had a white cell count of 20,000 with 96 per cent lymphocytes. Hospitalized, also, were two cases of encephalitis reputedly having had dengue just prior to the encephalitis. One of these expired and necropsy confirmed the diagnosis. The other case developed an aphasia and a partial agraphia, but otherwise recovered.

Schrumpf-Pierron[8] mentions several fatal complications in debilitated individuals.

Tuberculous patients apparently suffer at least a temporary retrogression because of dengue. Chaniotis and Scordombekis[9] noted a number of cases of tuberculosis developing subsequent to dengue.

Other than the above mentioned suquelae we have noted no ill effects except an almost universal lassitude of three to ten days.

Greek and French physicians,[10 11 12] writing of the 1928 Athens epidemic, mention many complications, especially of a purulent nature. The Athens epidemic, however, was very severe, affected 90 per cent of the population; caused several hundred deaths. Tisminakis and Konstantin[13] observed several cases of post-dengue epilepsy.

EXPERIMENTAL THERAPY

Convalescent blood, *vide supra*. Yellow bone marrow concentrate was used in an effort to increase the leukocytes. No increase was accomplished. This product has been shown potent in increasing granulocytes in other cases of granulocytopenia.[14]

Intravenous hydrochloric acid 1:1000 10 c. c. daily for 3 to 4 doses was given in several cases, hoping to stimulate the recalcitrant hematopoietic granulocyte manufacture. A slight increment was noted, but was not deemed sufficient to warrant continuance of the therapy.

Quinine was tried in doses of 15 to 30 grains a day, without success.

The presence of severe orbital

CASE	MG. PR.	RELIEF	CC WITH- DRAWN	PANDY	CELL COUNT	CULTURE	SUGAR	COL. GOLD
1	10	NONE	4	NEG	1	NEG	60	○○○○○○○○○
2	6	MODERATE	6		2			
3	14	NONE	5	POS	4			○○○○○○○○○
4	10	NONE		POS	−1			○○○○○○○○○
5	8	NONE	10	POS		NEG		○●●○○○○○○
6	15	MARKED	8	POS	4			
7	8	MODERATE	6	POS				○○○○○○○○○

Chart 4
Results of spinal puncture.

pain led us to try spinal taps. *Chart 4* shows the results.

We conclude that therapy is entirely symptomatic.

The writers greatly appreciate the cooperation of laboratory technicians: Theobald, Maxwell, Benjamin, Sottile and Rentz.

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THE RATIONAL TREATMENT OF NASAL DISEASES*

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Experience, while often a sad teacher, is nevertheless a highly important one. Through this source much information is acquired by the thoughtful physician which can never be obtained from books and periodicals.

What is it that makes the successful pediatrician? Is it a knowledge he has derived from books, where diseases are discussed in clear, cold type? It is a knowledge which he cannot explain to others, an intuitive understanding which comes from experience and observation.

And so it is that there are no diseases in any part of the human frame which can be treated successfully by routiné methods as furnished by textbooks, but which will be most successfully managed by the physician who studies minutely every case and combines intuitive and practical knowledge with that gained by reading and experience.

Progress in the recognition and treatment of all diseases is the daily history of medicine, and in no department is this truer than in nose and throat diseases. However, this advancement in nose and throat work has been reached only by those who have studied deeply into all their pathological conditions and have combined research and experience with practical applications.

The fact that every portion of the anatomy is dependent upon every other portion for the successful performance of its own individual function must necessarily indicate how important it is for the physician to be broadminded in his studies and not practice with the idea that the portion of the body to which his practice is limited is a distinct entity by itself.

If I may be allowed a criticism, it is a fact that too many men enter nose and throat work without the proper preparation, which largely means that they have had no practical experience in the treatment of any other class of disease. The laity itself is in much ignorance of this same point, for I have often been asked if a specialist also had to study medicine!

The specialist who thinks that with the triad armamentarium, spray, cautery and knife, he is able to treat and cure all nose and throat diseases will in a short time come to grief. There is entirely too much treating of symptoms in medicine and not enough treating of causes. It may seem odd for this statement to come from one who limits his practice to these diseases, but I honestly think that many a patient is today suffering from too much treatment. There is such a thing as overdoing matters, and the habit these days of persons having their noses and throats treated year in and year out is producing troubles which before did not exist.

Not long ago a patient came to me from a distant city in Florida and, like all those who have the treatment habit, she was able to tell me exactly her nose and throat troubles before an examination was made. She had only a few days to stay in the city, but she wanted treatment. From her I ascertained that for the last three years she had been under constant treatment for her nose and throat. She was treated for weeks in New York City by a certain well-known specialist. On her way home she had to stop in Baltimore because she felt the need of treatment. If she had not been on a through sleeper to her home, I imagine that she would have been treated at intervals on the way. She reached home, and the specialist there continued to treat her three times a week. When I examined care-

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fully the nose and throat condition in this lady, there was found only the dry, irritative state of mucous membrane incident to too much local treatment. "Madam," said I, "do you wish me to tell you honestly the severity of your trouble, Then if you wish such a statement from me, I would say that you are suffering from too much local treatment."

This statement is no idle fancy of the mind, for I am firmly convinced that many people today are afflicted with the treatment habit. Several years ago I read a paper before the Georgia Medical Association on "The Use and Abuse of Nasal Sprays." With increasing years of experience, I am more than ever convinced that the spray habit is becoming a fixture upon many of the American people. A more pernicious habit and one that affects more disastrously the nasal membrane can hardly be found than that of daily spraying the nose with some oily menstrum containing menthol. The "spray doctor" is even now spoken of and held in ridicule by the laity, for it does not take a Solomon to see that the specialist who daily calls "next" to the waiting horde of snifflers who fill his reception room is covering up his professional ignorance with cheap explosions of compressed air. Nor must we forget, in this crying desire of the uneducated public to have their noses sprayed, that it is in just such a manner that cocaine habitues are produced. When a patient is obliged to go to a specialist every day because of the craving to be sprayed, then the whisky bloat is in no worse physical condition than this same spray-obsessed individual.

Specialists in nose and throat work must recognize the fact that local treatment is often secondary to systemic. The man who daily treats his patients in an automatic manner, because when he looks into a nose or throat he sees certain objective appearances, must necessarily keep his patients coming to him indefinitely, for all such treatment will never be curative.

If the physician will study his cases thoroughly and make a careful examination at the beginning, it will not be often that a patient will have to spend a good portion of his time at the physician's office.

Hence the intent of this paper is a plea for a more thorough and rational treatment of the various nose and throat diseases, and, I may add, a plea for local treatment only when it is needed. I wish also to raise my voice against the universal and indiscriminate use of sprays and prolonged courses of treatment, which in many cases destroy the physiological functions of the mucous membranes and stamp an opprobrium upon this recognized specialty.

How often have we heard someone say: "I have been going to Doctor So-and-So for the last six months, and I am no better now than I was before?" Surely there is some ground for such adverse sentiments as these, and it is our duty as physicians to deal honestly with our patients. It is this honesty which distinguishes the true physician from the quack, and because a patient is able to pay a good fee is no reason why he should be kept under treatment when we know positively that his apparent improvement will last only so long as the treatment continues. There is not a physician living who does not sometimes make mistakes. I have no confidence in those who do not, but I do believe that mistakes are often the result of lack of thoroughness in the examination of cases. Other mistakes are sometimes due to a habit of routine practice, of using the same line of treatment for all cases.

Let us take some of the more or less subjective symptoms often complained of by persons who think that they have a nose and throat disease and see just what pathologic conditions they may represent and how easy it would be to treat them erroneously.

(1) Take first pain, which is a subjective symptom of prime importance to every individual.

In the nasal cavities proper, pain does not often occur, unless there is severe acute inflammation or severe traumatism. In acute rhinitis, for instance, pain, when it does exist, is of the hot, burning character, producing more pressure and congestive neuralgia in the surrounding parts than in the cavities themselves. The membrane is over-sensitive, especially to cold air and a dusty atmosphere. For this reason, it is illogical to allow people suffering with acute rhinitis or acute cold in the head to go out in the cold during the winter and to have the nasal cavities sprayed, thus affording double opportunity for more irritation of the mucous membrane. These cases belong to the family physician and not to the specialist. They need mild depletive measures at home if we would see the nasal mucous membrane return to its normal state.

Pain in the region around the nose is often indicative of some pathological condition of the cavities which empty their secretions through the nose. Pain on the side of the nose radiat-

ing out of the cheek bones is at least suggestive of antrum disease following an acute rhinitis.

Severe pain at the root of the nose, and a little external to the median line, especially if it be increased on pressure, is suggestive of a threatened abscess in the frontal sinus. However, pain as a diagnostic help in nasal diseases is too uncertain to be of any material aid.

(2) Take a second symptom, that of sneezing. In acute rhinitis we recognize this as a part of the disease and the congested, irritative state of the mucous membrane would offer sufficient explanation for the frequency of this symptom. The old idea that whenever a person sneezes he is taking cold, has long ago been exploded; for there are many local and systemic conditions which will produce this irritative explosion without necessarily meaning a cold.

There are some people who might almost be termed "habitual sneezers," and with these I do not class that numerous horde denominated "hay fever and rose cold sufferers," who sneeze on the slightest provocation. With this class of patients it is the first thing they are conscious of in the morning; they are guilty of it whenever they pass through varying intensity of lights; the passing from a cool atmosphere into that of a warm room will cause it, and even emotional excitements of various kinds must be reckoned in the same category.

How foolish, then, to treat this symptom alike in all individuals. It would extend this paper to an unpardonable length to go into minute details, and I shall only mention some of the causes of this symptom, so that you may see how necessary it is to study minutely every case.

(a) There is a class of individuals who have what I have denominated hyperesthetic rhinitis. If you will examine the nasal cavities of these individuals nothing abnormal will be discovered, and yet they will have spells of sneezing. If you touch the mucous membrane in these cases you will see its extreme sensibility.

This condition I have most often found in neurotic individuals and in those who do not take enough outdoor exercise. Local treatment is almost valueless, and results will be best accomplished by close attention to hygienic laws and careful building up by the family physician.

(b) There is another class of cases where the nasal cavities will show nothing pathological, and yet by further careful examination they will be found to have a marked acid dyscrasia. The blood is loaded to excess and the nasal and nasopharyngeal mucous membrane is constantly irritated. Think of spraying such an individual for the relief of his nasal symptoms!

(c) Then again we find those suffering with this symptom where a superficial examination of the nasal cavities reveals nothing abnormal, and yet by closer scrutiny and shrinking of the membrane we discover a polypoid condition of the mucous membrane at the posterior end of the focus of irritation, to be cured only by operative intervention, and yet too often have they already become the victims of the spray habit. These are some of the chief causes of the symptom referred to, and yet none of us would be contented with even such a limitation.

(d) Take another common subjective symptom, that of stenosis or stoppage of free respiration through the nose. Here it is that the unskilled and inexperienced get in their deadly work. The tissue covering the turbinate bones, as we well know, is known as erectile tissue, such as swells and shrinks according to the amount of blood which it contains. The most usual cause of nasal stenosis is a swelling of this tissue over the turbinates. This swelling and consequent blocking of the nasal passages may be due to either a true hypertrophy of the stroma elements of the membrane itself or to a swelling due to a stasis in or an engorgement of the erectile spaces through the determination of more blood to the parts. If due to the latter the mucous membrane will shrink entirely under the application of cocaine, and if to the former the hypertrophic condition will still manifest itself. The treatment of these two conditions must necessarily differ, and here it is that the successful rhinologist has been benefited by keen observation. Reduction of the membrane in the first instance, by means of the cautery snare and knife, is frequently justifiable, but in engorgement due to stasis, we must first seek the cause of this condition if we would have permanent successful results.

Take an instance of the latter: the man who inbibes freely at night and even during the day, and often eats inordinately. Every morning he suffers with nasal stenosis. But shall we cauterize or snare such a mucous membrane? Certainly not. Open the bowels freely, stop the pernicious mode of living, and the nasal stenosis will take care of itself.

Dr. H. J. Mulford has called attention to the importance of urinalysis in the proper treatment of nose and throat diseases. He has shown

that the condition of the kidneys is in a large measure responsible for certain changes seen in the nose and throat which entirely disappear under systemic treatment. The specialist who is successful in his practice is the man of broad observation, who looks beyond the narrow confines of the organs which he daily treats, and remembers that the whole animal economy is involved in the successful functioning of the smallest portion of the human frame.

(e) Take now an objective sign of nasal trouble, that of a discharge, and let us see how unscientific it is to treat it and not its cause. Many a nasal cavity is daily sprayed for a discharge without any reference to its place of origin. When one remembers that a discharge from the nasal cavity may have its origin from the maxillary antrum, the frontal sinus, the ethmoidal cells, the sphenoidal sinus, or from disease of the mucous membrane itself, one can readily see that it may be a sign of various pathologic conditions. Hence, for this reason, a thorough examination is necessary whenever a patient consults the physician for the relief of a catarrhal discharge from the nose. Time does not permit me to mention the signs and symptoms which enable one to make exact diagnoses in such cases, my main object being to call attention to the manifold origin of this one sign.

During last winter I saw several cases in which an attack of the grippe was followed by abscess of the sphenoidal sinus. Because ordinary treatment failed to effect a cure, they were sent to a specialist. The symptoms in these cases were almost universally the same. Intense pain in the top and back of the head, a feeling as if the head were tightly constricted in a band; pain worse in the early morning hours; a mucopurulent discharge from the nose at intervals. Objective examination showed an engorged mucous membrane. By shrinking the tissues with cocaine on a cotton applicator, the discharge could be seen coming from a point high up at the posterior end of the middle turbinate, frequently running down along the posterior portion of the septum. By contracting still further the tissues around the opening of the sphenoidal sinus, drainage was established in the natural way, and in a few moments the patient experienced relief. By using exactness in the drainage, these cases recovered in a few days, and by recognizing the source of the discharge one could treat it intelligently and at the same time quiet the patient as to the prognosis.

Another common complaint is the continual dripping of mucous secretion into the nasopharynx, producing that annoying condition, postnasal catarrh. In the large majority of cases this secretion comes from the mucous membrane of the nasal cavities, but there are many cases where it is due to the secretion's coming from some one of the neighboring sinuses or from disease of the nasopharyngeal mucous membrane itself.

Therefore, we can readily see that if the source of the secretion is not located, satisfactory results in the treatment cannot be obtained by the ordinary use of sprays and douches.

There is a distinct disease of the nasopharynx, known as chronic nasopharyngeal bursitis, where the pharyngeal sac or bursa has become chronically inflamed and pours out continually a tenacious mucus.

Patients suffering with this condition will complain of expectorating once every twenty-four hours a distinct scab of mucus, usually dry on one side and moist on the other, which has been lodged in a depression over the pharyngeal bursa. On inspection with the postnasal mirror one may readily see the depression in the center and a small opening leading into the bursa. Such cases are very unsatisfactory to treat, because one can benefit, but seldom cure them. It is certainly honest, therefore, to recognize these cases and tell the patients in the beginning what he or she is to expect, and not have them become disgusted because they seem to be getting no better. Cases of this character are frequently wrongly diagnosed.

Time does not permit me to extend this paper, even though there are many other common conditions of which I might speak which are often overlooked by the busy specialist. Conservatism and rational treatment of the nasal mucous membrane are gaining their adherents every day. Specialism too often causes us to be narrowed in the horizon of our clinical work, and too infrequently do we stop to consider those broad principles of medicine which should be utilized in the management of every case. There are many workers today in the field of rhinology who would have us treat the nasal cavities as we would a mathematical proposition, with fixed and invariable rules for treatment. They would teach the student of medicine that there must be a fixed diameter of these cavities, to be made so, if necessary, by wholesale destruction of tissue. They seem to forget that the divine Creator never made a perfect man, and we might say perfectly propor-

tioned nasal cavities. This aggressive treatment of nasal diseases is much to be deplored. I mean by aggressive such things as too frequent use of the electrocautery, operative intervention in every anomaly which prevents the nasal chambers from being mathematically correct in their proportions, and last, but not least, the daily use of sprays, which is unscientific and produces an exceedingly pernicious habit. Years ago Dr. Charles H. Knight, of New York, most happily expressed my own views on this important subject. He said:

"In consequence of this rhinological enthusiasm, the nose has been looked upon as a probable source of every human ill, and a ruthless slaughter of intranasal structures, without regard to their physiological functions, has been universally practiced. Happily a saner view is coming to prevail, and the belief is growing that epilepsy, asthma, dysmenorrhea and arthritis of the knee may have other causes than a hysterogenic zone or a point of pressure within the nasal fossae."

TRACHOMA INFECTION AND TREATMENT*

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As this is to be a clinical program, I have confined myself largely to a description of the technic of the treatment of trachoma which I have arrived at after thirty-eight years of experience with this dread disease. In regard to the manner in which trachoma is acquired by the patient, I wish to set down also the conclusion I have arrived at as a result of that experience. You can see at once that I am trying to avoid the more controversial aspects of trachoma. I am not trying to tell you how to diagnose a case of trachoma. I am not trying to tell you what is trachoma and what is folliculosis. I am sure no question in eye pathology has aroused more heated acrimonious discussion than the question of what is trachoma and what is not. However, in discussing the origin of trachoma in the patient, I cannot wholly escape controversy. There are many who claim that the disease arises as a result of malnutrition and that it is not a true infection. A distinguished member of this Section, the late Dr. J. A. Stucky, wrote:

"I have never seen a case in which there was unmistakable evidence that it was contracted by contact with one having trachoma. I believe genuine trachoma will be proven to be a deficiency disease, a term sanctioned by custom and embracing disorders due to faulty or ill balanced food. I am still of the opinion that trachoma begins as adenomatous conjunctival irritation, due to improper feeding and impaired metabolism, and I join with a reunited profession in the hope that we are near to isolating the specific etiologic factor in its production."

This is a fair expression of the opinion of those who believe that trachoma is a disease due to a lack of certain vitamins. My experience has caused me to believe that trachoma is a disease transmitted by infection and that it produces an infectious purulent secretion. I have seen many hundreds of cases develop as a result of contact with trachoma patients. These patients were not undernourished, but were healthy, well-fed children who were unfortunate enough to be placed in a school where trachoma was prevalent.

During a period of more than ten years, with my partner, the late Dr. George W. Hale, I had charge of the children in the Tennessee Industrial School. There were hundreds of cases in the school when I entered practice in 1899. I had just finished a service of nearly two years and a half at the Manhattan Eye and Ear Hospital, where I had seen a great deal of trachoma, but nothing to compare with the number and variety of the cases I found in the school. Our Sundays were spent in surgery at the school and a substantial part of our week days were taken up in local treatment at the office. A goodly portion of this work fell on me naturally. During this period I was startled by an outbreak of what appeared to be an epidemic of purulent ophthalmia. About twenty of the little girls from ten to fifteen came down at one time with every appearance of purulent ophthalmia. There was intense swelling of the lids, great chemosis and profuse purulent discharge. The smears did not show the gonococcus, but the clinical picture was the same as that of gonorrheal ophthalmia. I isolated the children in a separate building and put nurses in charge to carry out the routine treatment of purulent ophthalmia. When we got to the bottom of the thing we found that the children had discovered that those children with infected eyes were carried into the city for treatment. This appeared to them quite an event in their drab lives and one enterprising youngster suggested inoculating their eyes with secretion from the eyes of the infected children. This was readily agreed to and was carried out with the dramatic results described above. The

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cases infected ran a stormy course, but terminated without corneal involvement and on subsidence of the acute symptoms settled down and ran the regular course of trachoma. To me this experience proved several things. No laboratory experiment could have demonstrated more clearly that trachoma is a transmissible disease carried by infectious secretion from one eye to another. It also showed that mass infection of trachomatous secretion reacts violently in the eye with all the symptoms of purulent ophthalmia. To my mind it also explains why we see few cases of acute trachoma. The amount of infection conveyed on towels and through the medium of wash basins is so small that the eye reacts to it mildly and it is only when the stage of folliculosis and granulation is reached that it attracts attention. In other words, the infectious agent is more or less feeble and where ordinary cleanliness is observed the chances of infection are slim. This would account for freedom from infection in families where there is a case of trachoma so that we may say that trachoma is a filth disease due to the indiscriminate common use of towels and wash basins.

In the course of this large experience we made use of every known treatment. We submitted a great many of these cases to grattage. We used the Knapp roller to express the follicles and followed by scrubbing the lids with a stiff tooth brush dipped in a solution of 1-500 bichloride solution. A pressure bandage was applied to limit the swelling of the lids. This treatment was efficacious, but the resulting scarring of the conjunctiva was disturbing. We used the copper sulphate stick to some extent, but gradually did away with it. Out of all the methods tried I gradually evolved a line of treatment that ultimately proved most satisfactory. These patients were ultimately cured of their trachoma with a minimum of scarring and complete recovery of vision except, of course, those neglected cases who had suffered deep ulceration of the cornea before treatment was instituted. In some of these cases vision was hopelessly lost before treatment was begun.

Before outlining the treatment I would like to present briefly the histories of three cases out of the many who were cured of their trachoma.

Case 1.—A. H., white, consulted me first on July 13, 1899, on account of discomfort from his eyes. An examination disclosed both upper and lower lids studded with trachoma granules. I advised him to secure a boarding place and prepare for a lengthy stay in the city so as to have daily treatments. He lived some two hundred miles from Nashville and my advice was a shock to him. He thought I ought to be able to write him a prescription and let him return home. The upshot was that he returned home without treatment. The next time I saw him was on October 20, 1899, when he was led into the office by his wife to all intents and purposes blind. His corneae were covered with pannus and ulceration. He said: "I have come prepared to do anything you say." He remained under daily treatment for months and was discharged with every appearance of cure. I saw him at intervals for years until his death and there was never at any time the slightest indication of recurrence. I have a record of his refraction made September 11, 1905, showing a visual acuity of twenty-tenths with a plus 1.00 sphere. There was only the slightest evidence of scarring of the conjunctiva, which I think would have been overlooked unless one were familiar with the history.

Case 2.—T. J. S., white, aged 47, was led into my office September 14, 1905, completely blind with trachoma and pannus. He had been under treatment for a long time and was completely discouraged. He came to me partly for family reasons and partly because I was one of the younger men who he hoped had something new. This was a case that tried his patience and mine sorely. He would get to the point where he was seemingly well and in twenty-four hours would light up with a violent recurrence and we would have to start all over again. Daily treatments were carried out during these recurrences and after about two years he had no more recurrences. He lived twenty-six years after I had discharged him as cured and there was never any sign of recurrence. He developed glaucoma, I did an Elliott trephine on each eye and he maintained useful vision until his death. His refraction in 1908 was 20/20 in each eye with a plus 0.75 sphere.

Case 3.—Mrs. S. B. Mc., white, aged 29, was led into my office June 1, 1910, blind with trachoma and pannus. She came to my office every day for seven months and was discharged cured at the end of that time. She has had no sign of recurrence since. I refracted her on November 22, 1933. Her visual acuity was right 20/30 with plus 0.25 sphere, plus 2.75 cylinder, axis 85 degrees. Left 20/20 with plus 0.25 sphere, plus 2.50 cylinder, axis 85 degrees. I think with a casual examination her conjunctiva would be pronounced normal by almost any oculist.

I have reported these three cases on account of the element of time that entered into them. They were cured of their trachoma, I was able to keep in touch with them for a long period of years, there was not the slightest evidence of recurrence and all three recovered normal vision after having been blinded by the disease to the extent that they had to be led.

I will now describe the technic of the treatment that I finally adopted. First of all, I explain to the patient that he must make up his mind to undergo a long and tedious course of treatment. I explain, too, that he has a disease of the eyes that will ultimately blind him if it is not successfully treated; that in his present condition he not only faces blindness himself, but he constitutes a menace to the eyesight of his family and friends. In the severe cases, es-

pecially those with pannus, patients are not hard to convince and are prepared to undergo almost anything if they can be assured of a reasonable chance for recovery. Once the treatment is started improvement begins almost at once and they are heartened and encouraged to go on. It is the patient in the earlier stages before pannus and ulceration has interfered with vision who is apt to balk at the prospect of long and more or less painful treatment. The treatment is carried out daily. The eyes are anesthetized with cocaine or butyn. A cotton mop on a stiff applicator is dipped in 15 per cent silver protein, the lids are turned back and the trachoma follicles or ganules are massaged rather vigorously throughout the conjunctiva where the granules are located. After the massage, a 1 per cent yellow oxide of mercury salve is squeezed into the eye from a collapsible tube. If pannus and ulceration are present, ethyl morphine hydrochloride six grains to the ounce is added to the yellow oxide salve. The patient is given a solution to be dropped in the eyes night and morning consisting of:

Copper sulphate	Grains V
Glycerine	Drams II
Camphor water q. s.	Ounce 1

M et Sig: Two drops in eyes night and morning.

This is a treatment for patients who appreciate their desperate situation and who put a high valuation on vision.

I am giving this clinical lecture for those who say that trachoma cannot be cured. I am giving it for those who say if you cure a patient of trachoma the patient did not have trachoma. When a man makes a statement like that it is of course begging the question. It is like moving the previous question, and shuts off all debate.

There are two things that I know about trachoma as well as I know any medical facts: that trachoma is conveyed by infectious secretion from one eye to another, and that trachoma can be cured.

PANNUS

In the treatment of trachoma I disregard pannus except to use atropine and add ethyl morphine hydrochloride to the yellow oxide salve.

I know there are those who say that pannus is an entity in itself and that roughness of the lid has nothing to do with the formation of pannus. I quote from Dr. Harvey J. Howard, who said in a paper before the Academy in 1932:

"It is especially gratifying, regarding the question of pannus, that those most familiar with trachoma are now in almost universal accord. The corneal changes in trachoma are no longer looked upon as due to mechanical irritation, but as an essential part of the disease."

If this is so why does the pannus begin to improve as soon as the follicles and granules are rubbed smooth by massage? One feature of the yellow oxide salve is to lubricate the lids and make them slide more smoothly over the cornea. The yellow oxide of mercury is also a valuable antiseptic.

If pannus has nothing to do with the roughness of the lid, why is pannus practically confined to the excursion of the upper lid? As we know, the upper lid is more closely applied to the cornea and is under more tension than the lower lid, as it is the duty of the upper lid to sweep away dust and foreign bodies that may find lodgment there as well as to keep the cornea moistened. The location of the lacrimal glands assures that moisture shall be supplied to it for that purpose. This close application of the upper lid to the cornea renders it peculiarly susceptible to any abnormal roughness of the lid and any departure from its normal smooth and velvety texture reacts at once upon the cornea. The simplest and most obvious explanation of pannus is that it is a traumatic injury to the cornea, causing abrasion and ulceration of the epithelial layer in the beginning, and that vascularization is nature's defense mechanism for the nutrition, protection and repair of the cornea.

I think the use of ethyl morphine hydrochloride in pannus and ulceration is of great value. By increasing the local blood supply it aids in the nutrition of the cornea and in the absorption of the products of inflammation. It is surprising how much vascularization and opacity will disappear under the daily use of yellow oxide and ethyl morphine hydrochloride salve.

I think I have made myself sufficiently clear that I do not believe that trachoma is caused by vitamin insufficiency. Trachoma is now frequently referred to as the wrestler's disease and we could hardly classify wrestlers as victims of malnutrition. I believe it is an infection conveyed from eye to eye by contact with the infectious secretion. However, do not misunderstand me. I believe that nutrition is a strong arm in the treatment of the disease and that wherever there is vitamin deficiency it should be supplied. I learned my lesson when I was on House Staff service at the Manhattan Eye and Ear. We

had an enormous number of children from the east side with phlyctenular ulceration and with corneal ulcers. There were many brilliant men on the staff such as David Webster, J. B. Emerson, van Fleet and others. Picking up pointers from different men, the house staff worked out a technic of treatment for these cases. What we picked up from the visiting staff was the cutting off of sweets, tea and coffee, and placing the patient on plain substantial food with medication of atropine, yellow oxide of mercury salve and syrup of iodide of iron internally. What the house staff added was a thorough cleaning up of infected tonsils and adenoids. My contribution was the addition of cod liver oil to the syrup of the iodide of iron. I prescribed two teaspoonsful of cod liver oil with the dose of the syrup of iodide in proportion to the age of the patient. It was gratifying to see these sickly, sallow victims of malnutrition blossom like a rose under this regimen. And this was in the days before we knew anything about vitamins A, B, C, D, E, F, G, *et cetera*. I believe no better regimen could be prescribed for trachoma patients who are suffering from malnutrition.

INCOMPLETE ABORTION AND MISCARRIAGE*

ANALYSIS OF 521 CASES

By T. M. BOULWARE, M.D., F.A.C.S.,
Birmingham, Alabama

The relative frequency of incomplete abortion and the occasional associated mortality make this subject a commonplace yet pertinent one. My paper this afternoon is concerned with treatment only. Pathological findings which have a direct bearing on treatment will be briefly mentioned and a series of 521 early incomplete terminations will be reported.

Incomplete abortion exists when a part of the gestational product is expelled prior to the sixteenth week with retention of a variable portion in the uterus. In a brief consideration of some of the characteristic features of incomplete termination it seems quite evident that the period of gestation will largely determine the pathological picture and probable clinical course. Abortions during the first six weeks are rarely incomplete because of the loose attachment of the developing decidua capsularis. Abortions during the second six weeks are quite prone to be incomplete because of the rather firm attachment of anchoring villi. Terminations after placentation has been complete are less liable to be incomplete, although retention of the entire placenta is not uncommon. Soon after fetal death or expulsion, most of the retained chorionic cells except those immediately adjacent to the maternal blood sinuses begin the process of necrosis. If retained long enough, this degenerative chorionic tissue may eventually lead to fever, foul discharge, and perhaps to what has formerly been termed sapremia. (Toxic absorption would seem to be a more suitable term.) This process may cause the temperature to rise as high as 104 degrees when but little actual infection is present. The continued retention of this tissue offers an excellent culture medium for bacterial growth and actual infection may develop several days later. We know that some women do harbor pathogenic microorganisms in the vaginal vault and that infection cannot always be attributed to examination or instrumentation because we see occasional cases where neither was done. Hemorrhage, one of the common signs of incomplete termination, is of course due to exposure of maternal blood sinuses by the partially detached chorion. A uterus containing such tissue cannot properly begin involution, clots and serum collect in its interior, and the partially exposed sinuses are ineffectually thrombosed. Another point in pathology concerns the so-called leukocytic barrier. We know from autopsy studies that in some cases of frank puerperal endometritis nature does attempt some limitation by throwing out large numbers of leukocytes about the uterine mucosa. This reaction, typical of many types of acute inflammation, is often largely limited to the decidual layer, although later invasion of the necrotic material itself may occur. Some pathologists doubt the invariable formation of any actual wall, but for purposes of discussion we may assume the presence of some limitation effort in most cases of real septic abortion.

In every patient with definite incomplete abortion who has a profuse bloody discharge after 48 hours and who, after bimanual examination, is believed to have retained placental tissue in any appreciable amount, the uterus should be evacuated. By the term evacuation I do not refer to currettage as it is usually done for diagnostic purposes. During the first 48 hours following

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the incomplete expulsion, I believe that a fair trial of oxytoxic preparations is surely indicated unless hemorrhage is alarming in amount. If the abortion does not complete itself in this period of time, operative completion seems advisable. Inasmuch as the majority of the patients in my series had already passed the 48 hour period at the time of hospital admission, only 47 cases were given the course of oxytoxic drugs. Of these 47 cases, 18 completed themselves during the following 48 hours. To wait longer will usually mean prolonged convalescence, repeated blood transfusions, a constant danger of later infection, and continued worry to physician and patient alike.

Is there a relatively safe means of emptying the uterus after a period of waiting fails to bring about placental expulsion? Are we warranted in allowing the retained degenerating intra-uterine tissue to remain indefinitely as a constant source of hemorrhage and possible later infection? Is the mortality and morbidity rate of patients subjected to operative removal of the uterine contents in keeping with the rates of those patients treated by more conservative methods? These questions I hope to answer.

Our procedure for uterine evacuation is as follows:

After routine perineal preparation, a careful bimanual examination is made. Examination under anesthesia permits a much more satisfactory determination of size and position of uterus and condition of appendages. The cervix is then grasped with Burch tenacula, cleansed with a suitable germicidal agent, and the uterus carefully sounded. If sufficient cervical dilatation is not already present, Hegar dilators are used. The gauze-covered finger may now be introduced into the uterus and sometimes the retained fragments may thus be removed. More often, sponge forceps or ovum forceps will be necessary for this purpose. A small pack, saturated with a germicidal agent and then squeezed dry, is now inserted to remain six to eight hours. The last step is to replace the corpus uteri in its forward position if the manipulations have displaced it. The large round placental scoop is occasionally used, the sharp curet never used. Such a method we believe to be simple to carry out.

Is the method safe? The argument always advanced against curettage is that the sharp curet penetrates the protective leukocytic barrier and infection is thus spread. This is probably quite correct if the sharp curet be used in frankly septic cases. In reply to this contention, I should like to point out that: (1) we do not use the sharp curet; (2) the majority of such cases are not truly septic; (3) generally there is no leukocytic barrier of any extent present in other than septic cases; and (4) if present, being largely situated in the decidual layer, it would probably not be extensively damaged by finger or carefully used forcep. Statistical study of our series shows that 83.6 per cent of the operative cases did not have a temperature rise of as much as one degree following uterine evacuation. These figures do not suggest extensive intra-uterine traumatism.

Is the method advisable or necessary? We believe some such method advisable if the termination is not complete within 48 hours. Continued retention favors infection and prolongs convalescence. Repeated blood transfusion and some type of curettage are often eventually necessary in the prolonged cases. It cannot honestly be said, of course, that such a plan is necessary because most such patients if let alone will eventually recover, provided they do not become exsanguinated or infected meanwhile.

A study of our case histories reveals several interesting points.

The admission temperatures of 35 per cent were normal and those of 43 per cent were between 99 and 100 degrees, thus giving a total of 78 per cent with admission temperatures of below 100. Evening temperatures were usually taken as admission temperatures.

Admission leukocyte counts showed that 53 per cent had counts of less than 10,000.

The average time elapsing between abortion and hospital admission was 3.7 days.

In the series there were 19 admitted criminal abortions, but this figure is probably much too low.

Blood cultures were taken on admission on all known cases of criminal abortion and on such other cases whose temperatures and symptoms even suggested true sepsis. There were five patients with positive admission cultures, these cultures being obtained before any medication or therapeutic measures were attempted. Of these five cultures, four were hemolytic streptococcus and one *Staphylococcus aureus*. No patient with a negative admission blood culture either developed a positive culture later or died.

Nineteen cases, including four of the positive culture cases, received blood transfusion.

The average duration of hospital stay in the negative culture group was 4.2 days.

There were three deaths in the series of 521 cases. Analysis of these deaths will be given later, but all three were abortions of admitted criminal origin, all three had positive blood cultures on admission, and one died forty minutes after admission.

Table 1

ANALYSIS OF RESULTS

	Number Deaths	
521 Cases		
19 admitted criminal		
4 positive admission cultures		
3 evacuated	1	
1 not evacuated	1	(50 per cent of deaths)
15 negative admission cultures		
10 evacuated	0	
5 not evacuated	0	
502 apparently non-criminal		
484 evacuated	0	
18 not evacuated	0	
Total criminal and non-criminal deaths	2	0.30 per cent of total cases

ANALYSIS OF DEATHS

Case 1.—Criminal abortion fourteen days prior to hospital admission. The patient entered the hospital in the last stages of septicemia with a positive blood culture, of a hemolytic streptococcus. She had no treatment except stimulants and intravenous saline and died forty minutes after admission. (This case is not included in the mortality statistics.)

Case 2.—Self-induced criminal abortion nine days prior to hospital admission. History of chills and fever for the preceding four days, positive admission blood culture of hemolytic streptococcus, a small portion of the placenta was removed from the external os, the uterine interior not being invaded. She died two days after hospital admission.

Case 3.—Criminal abortion eight days prior to hospital admission. Chills and high fever for the preceding five days. On admission blood culture was positive for *Staphylococcus aureus*. She was still passing large clots. The uterus was evacuated, large amounts of foul placental tissue being removed. She had six blood transfusions, intravenous mercurochrome, vaccine, repeated positive blood cultures, and died nineteen days after hospital admission, with definite signs of pyemia at death.

In discussing these findings I should like to state that many of our apparently septic cases were not truly septic ones, even though some signs so indicated. In the series there were several cases with admission temperatures of over 102°, with leukocyte counts of over 10,000 and with rapid sedimentation rates. The majority of even these cases had a prompt and permanent temperature fall to normal within 12 hours after uterine evacuation. This would not have been true had these cases been truly septic. We, therefore, believe that toxic absorption alone may produce many signs quite similar to those of true sepsis.

The value of blood transfusion for severe anemia needs no discussion. In our patients, if the need was evident, transfusion was done prior to operation. The low incidence of 2.8 per cent in the non-septic cases evidences another advantage over continued waiting. Repeated small transfusions were freely given patients with definite sepsis.

During the past few years we have occasionally used 1 per cent mercurochrome intravenously in some cases of incomplete abortion with admission temperatures of over 102°. We think results have been gratifying in many cases, but disappointing in others. An occasional chill and transitory diarrhea have been observed, but repeated urinalyses have failed to reveal any tubular damage as evidenced by casts. While not advocating any routine use of this preparation, we think some results have justified its use. By no means is it a panacea.

General systemic measures aimed at maintaining natural powers of resistance are not neglected. In addition to blood transfusion, medical consultation is obtained on all afebrile anemic cases, a suitable diet is assured, and specific medication for the secondary anemia ordered.

One last question for consideration concerns any invasion of the uterus in a frank case of septic incomplete abortion. The advisability of any interference here is, of course, much more doubtful and open to criticism. Our primary consideration in such cases should be maintenance of natural resistance. To that end a high vitamin diet, fluids freely by mouth and vein, and repeated small blood transfusions should be employed. Most physicians will shun interference in such cases and possibly rightfully so. However, it would seem that the continued retention of large amounts of infected degenerating placental tissue *in utero* would surely add fuel to the fire of pelvic and systemic infection. If it is true that only a minimal amount of intrauterine trauma is done with finger or forcep, then evacuation may be given some consideration in selected cases. By no means do I believe that every patient with incomplete postabortal sepsis should have the uterus surgically emptied as a routine measure. In a few selected cases I do consider such interference both justified and indicated. The amount of uterine hemorrhage, the amount of retained placental tissue

and the condition of the cervix uteri should be the deciding factors in the selection of such cases.

SUMMARY

(1) Five hundred twenty-one cases of early incomplete terminations of pregnancy are reported. The major portion of these had operative evacuation of the uterus.

(2) Signs of toxic absorption may sometimes closely simulate those of true postabortal sepsis.

(3) We consider uterine evacuation, as described, to be a simple procedure and a relatively safe one. We also consider it to be an advisable procedure if the abortion does not complete itself within 48 hours.

(4) We believe our series at least casts some doubt upon the idea that it is always dangerous to invade the uterus of incomplete abortion.

(5) Operative interference in cases of incomplete postabortal sepsis is occasionally indicated when constant hemorrhage is present. Conservative measures which maintain natural powers of resistance are most important.

(6) The procedures herein described are not intended to be radical. Our results have seemed quite satisfactory over a period of years and our mortality and morbidity rate compares favorably with similar series treated by more conservative measures.

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DISCUSSION (*Abstract*)

Dr. Roy L. Grogan, Fort Worth, Tex.—I shall be explicit as to my care of the different types of abortion. Given a case of inevitable abortion bleeding profusely, and a patient who does not respond to oxytoxics, my routine is as follows: after thorough preparation the cervix is exposed by introduction of a large bivalve speculum, then a large five-yard roll of sterile gauze is taken with the dressing forceps, packed firmly against the external os, through the vaginal vault, and both fornices, thus finally filling the entire vaginal canal. A prominent physician, when asked how much gauze to use, said: "Just a hatful," and always pointed to his high hat which rested on a near-by table. Large amounts should be used. Firm pressure is made against the tampon while the speculum is being removed. This is allowed to remain twenty-four hours and usually upon its removal the ovum and much debris will be found on the pack. Surgical removal may be resorted to if this procedure has not been successful, in the event the patient is afebrile, this being accomplished by a sponge over the gloved finger or ovum forceps. Ergot and pituitrin are administered subsequently. In the event the fetus is too large to be withdrawn through a moderately dilated cervical canal evacuation is accomplished by a vaginal hysterotomy.

Referring to the treatment of septic abortion, it is universally accepted that treatment should be expectant, as a simple curettement tends to increase both mortality and morbidity. If the cervix is widely dilated and a septic mass is accessible it may be removed. If care is exercised this may be accomplished by finger or ovum forceps, but under no circumstances should a curet be introduced. With bulging of the posterior cul-de-sac a posterior vaginal incision to promote drainage should be made. It has been my observation that intravenous administration of drugs or use of nonspecific proteins or sera are not at all helpful. Unquestionably it is the consensus of opinion that small multiple transfusions of whole or citrated blood are helpful.

Dr. Richard Paddock, St. Louis, Mo.—Dr. Boulware's report is a definite contribution to the therapy of the puerperal complications, bleeding and infection. The logic of this method of treatment is based on the bacteriology in these cases.

Only a few years ago, when cultures were taken in the usual manner from the uteri in these cases, the report frequently came back, "no growth." We then assumed that we had failed to get the offending organism, in spite of the fact that signs of puerperal infection were present. In the past ten years, since anaerobic cultures have been taken from these cases, we find that the offending organism, in the majority of cases, is the anaerobic streptococcus.

These organisms are of low pathogenicity, but develop in great abundance in the uterus. They thrive on the excellent culture medium of the necrotic material left in the uterus. As these organisms multiply they may be taken up by the blood stream in overwhelming numbers. Then there may follow the disturbances from infection such as thrombosis of the pelvic veins, pelvic abscess, peritonitis, infarction of the lung with abscesses, as well as the later manifestations of extensive infection.

The treatment of the cases, as outlined by Dr. Boulware, removes from the uterine cavity the culture medium on which these organisms grow before they have developed in sufficient numbers to become overwhelming. One must be cautious in carrying out this procedure so that the uterine wall will not be injured.

Another step in the removal of the material from the uterine cavity is to give an intra-uterine douche. This procedure as followed on the Obstetric Service at Washington University is to insert into the uterus an intra-uterine douche nozzle with two-way flow. Under low pressure a litre of potassium permanganate solution 1 to 1,000 at a temperature of 106° F. is run in. This solution is acidulated with 50 c. c. of normal sulphuric acid just before it is used. The acidulation causes oxygen to be liberated rapidly. Other warm antiseptic solutions may be used for the intra-uterine douche.

While the treatment as outlined by the essayist is not the usual method of handling these cases, the good results with low mortality and morbidity certainly rec-

ommend its use. This procedure is finding more favor as the results of its use are brought before obstetricians.

Dr. Boulware (*closing*).—Dr. Grogan's routine accomplishes in the main the same effect as the procedure I have used. Dr. Paddock's remarks on bacteriology are instructive. In conclusion, I merely wish to say that in our hands the method of uterine evacuation has given most satisfactory results. We do not consider it a radical policy and we believe our series proves conclusively that such a routine is both safe and rational.

HERNIA IN RAILROAD EMPLOYEES*

By CHARLES C. GREEN, M.D.,
Houston, Texas

With the exception of a very small percentage of cases, it is the consensus of opinion that hernias are the result of congenital defects and are not traumatic, nor should they be placed in the category of accidents.

Railroads and other branches of industrial organizations have been the prey of unscrupulous lawyers and disloyal employees who have taken advantage of the fact that hernias are ofttimes overlooked, even when physical examinations are required before employment. Consequently, it behooves the railway surgeons to be on the *qui vive* when examining an individual for employment. With the possible exception of claims for back injuries, hernias, in my opinion, have cost the railroads more money than any other condition, and the deplorable fact is that these claims are all unjust and, in a large majority of cases, are premeditated fraud. In thousands of cases men seek employment knowing that they have hernias, and it is their intention to claim injury and collect damages at the earliest moment after employment.

The foregoing statement demands no proof before a group of railway surgeons, and it should have our serious consideration. As railway surgeons, it is our duty to protect the roads from unjust claims and to purge their roster of employees who would make unjust claims for accidents.

I have heard physicians say, "If you are convinced that hernias are not accidental, why not suggest to the company that it pay no claims for injury resulting from hernia?"

Theoretically that would be fine. But we are confronted with the cold facts that the courts and men, especially juries, hold that hernias are always accidental and they assess damages for such claims almost daily.

What can we, as examining surgeons, do to reduce the number of claims for injury and decrease the economic loss in cases of hernia?

(1) Carefully examine all classes of employees before their employment.

(2) Develop a method of repair which will result in the smallest number of recurrent hernias.

Let us consider the question of examination, which I shall discuss in detail.

First, no examination can possibly be carried out successfully without removing the applicant's clothing. In every instance in which a patient with hernia has entered the employ of our road, under my administration as chief surgeon, it has occurred because the examining surgeon did a hurried examination and failed to remove the clothing.

After the clothing has been removed, a careful inspection should be made, keeping in mind the favorite sites for hernia, namely: the epigastrium, umbilical, inguinal and femoral regions, and any scar following an abdominal operation.

It is possible for a hernia to exist at any of these points which is not discernible by inspection. An epigastric hernia may exist and the patient not be cognizant of the fact, but if one carefully palpates this area he will readily discover the defect. An umbilical hernia is readily discovered and there is no excuse for overlooking one. But not so with the most common hernia, the inguinal. Here there is quite a different problem. An inguinal hernia may be readily discovered by inspection in very thin individuals, especially a direct inguinal hernia. But in cases of indirect inguinal hernia, in well nourished or fat individuals, one may very easily overlook the defect. The inguinal canal is four to six inches long, depending upon the size of the individual, making it quite possible to overlook a rather large incomplete hernia, if one depends entirely upon inspection. Consequently, it is necessary to insert the finger into the canal and direct the individual to cough or bear down, which will cause the hernia to descend and to be felt by the examining finger. By such an examination no hernia can be overlooked.

A careful and thorough examination must be made, calling into use each method of examination, as inspection and palpation, and often a history is needed to complete the job.

*Read in Section on Railway Surgery, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

We represent the railroads and, everything being equal, we should give our employer the benefit of the doubt. So where an applicant has an enlarged inguinal ring, with or without impulse on coughing or effort, I reject him for service as having a potential hernia.

And may I digress just long enough to pay tribute to the integrity and justice of the railroads? I have been connected with the Southern Pacific Railroad since 1911. I have testified in numerous cases and no one, from the claim adjuster to the chief executive, has ever asked me, directly or by innuendo, to shade my testimony one scintilla. In cases in which there is an element of doubt, they often give the employee a pension for total and permanent disability rather than risk doing an injustice to any individual. Consequently, our duty is to keep out of service any individual who possesses a potential hernia.

Although we may be as careful and conscientious in our examination as is humanly possible, there will creep into service a few cases which have congenital physical defects which result in hernia. Such cases must be treated surgically, and it is up to us to perfect a technic which will give the greatest number of permanent cures.

Although the treatment of hernia is one of the most ancient surgical procedures, still there is no standardized method of handling these cases. There are several operations, all of which have their proponents and opponents, and all of which have certain virtues which make them applicable in individual cases.

There are still differences of opinion as to which part of the operation is the most essential. One group contends that if the sac is dissected high up and ligated, it will retract into the abdominal cavity and the hernia will not return. Others claim that one need not worry about the sac, so long as he closes the ring tightly and repairs the relaxed inguinal canal. I cannot agree with either, as I have carefully ligated the sac so high up that it retracted out of sight, then followed this with a careful repair of the inguinal canal, and still some of them recurred.

But there are cardinal features in the repair of a hernia which must be observed if we expect a cure. I shall not take up your time in discussing the various methods of repair, because I know all of you have tried every method known to man, and still have your failures.

Two deaths in our city during the past two years following hernioplasty in uncomplicated cases were the impelling force which provoked this paper.

Such deaths are extremely rare in the hands of competent surgeons; consequently, when they do occur, a careful study of the cause of death should be made. Was the surgeon qualified to perform this operation? Was the patient thoroughly examined before the operation? Was the patient properly prepared? Was anything left undone that would have made the operation safer? All of these questions arise in the minds of competent, conscientious surgeons.

A study of statistics from an institution where one group of surgeons operates should give us a fair idea of what may be expected in cases of hernia, and I therefore invite your attention to a discussion of the end results of three hundred and fifteen cases of hernia operated upon at the Southern Pacific Hospital in Houston during the past three years.

At our hospital we have performed over twenty-three hundred hernioplasties since 1911 with one death, an old man who presented himself for treatment with a strangulated hernia with gangrenous gut.

In the series of three hundred and fifteen cases to be reported, all were indirect inguinal hernias and eight were complicated when admitted to the hospital.

(1) Strangulated hernia with gangrenous gut, 3
(2) Strangulated hernia without gangrenous gut, 2
(3) Strangulated epiplocele, 3

The methods of anesthesia used were:

(1) Ether, 29 cases
(2) Ethylene, 2 cases
(3) Local, 23 cases
(4) Spinal, 261 cases

We no longer use ether. When a general anesthetic is used we employ ethylene and other forms of gas anesthesia.

The methods of repair were as follows:

(1) Ferguson-Andrews, 157
(2) Bassini's method (cord transplanted), 135
(3) Bloodgood's modification of the above two methods, 23

In this series, there were four recurrences, or 1.27 per cent, which is much lower than in other clinics. This low percentage of recurrences, we believe, is due to the plan we have adopted in treating hernia, and I shall attempt to call your attention to certain features which we believe contribute to our success.

Careful examination of the patient before op-

eration to ascertain his operability we believe to be just as necessary in patients to be operated upon for hernia as in other cases, and we rigidly follow this plan.

The postoperative period of convalescence may be made more comfortable by proper preoperative preparation, including rest, plenty of fluids and such medication as is necessary for proper rest the night before the operation.

After preparation, our next important decision is the selection of the anesthetic. It is obvious from our statistics that spinal anesthesia in our hospital is the anesthetic of choice, as two hundred and sixty-one cases were given spinal anesthesia.

A casual observer may not appreciate the vast importance of the selection of an anesthetic, but those of us who have witnessed a patient's recovery from an anesthetic are convinced that the type of anesthesia used often determines the success or failure of the operation.

Many of us have seen strong men coming out from under the influence of a general anesthetic, raving and attempting to get out of bed, and when restrained, so powerful that three or four attendants were needed to hold him in bed. Certainly, such a picture impresses us with the possibility that the repaired hernia may recur before the patient has regained consciousness.

Spinal anesthesia obviates this danger. Local anesthesia does also, but local carries with it a little more danger of infection, because of multiple skin punctures and the local ischemia due to local infiltration.

Another important factor in hernia surgery is the nausea and vomiting which follow general anesthesia. This causes the patient to put a strain on the suture line, which may result in tearing the tissue. Not any of this attends spinal anesthesia.

All of the foregoing difficulties may be overcome and still our efforts may result in failure if our operative technic is not what it should be. First, it goes without saying, perfect asepsis must be maintained or infection will develop and in a majority of cases this will result in a recurrent hernia. Second, in repairing a hernia, we must see to it that fascia and not muscle tissue is used in repair. Fascia has practically no blood supply; consequently, if it is put under much tension it necroses and the hernioplasty is a failure. It is absolutely essential that these structures be not under too great tension.

And in some cases, especially where the rings are enormous, or where bilateral hernia is repaired, it is impossible to suture the conjoined tendon to the inguinal ligament without putting too much tension on these structures, either by Bassini's or Ferguson-Andrews' method, so we have resorted to Bloodgood's modification, which we have modified further, and which is done as follows:

When it is found that there is too much pull on the suture line, when the conjoined tendon is sutured to the inguinal ligament, an incision is made through the anterior sheath of the rectus, parallel to the suture line, thus allowing the conjoined tendon to be sutured to the inguinal ligament without any pull at all. The operation is continued then as if this step had not been added.

Fearing that this may weaken the abdominal wall because of lack of support for the rectus muscle, we have devised a method of supplying the rectus muscle with an anterior sheath. With No. 2 chromic catgut the suture is passed through the external oblique and the cut edge of the rectus sheath is picked up by a U suture drawn out on the surface of the external oblique near where it started. Two or three sutures of this character are used and then drawn tight and tied. Thus we reconstruct a new sheath for the rectus muscle and have enough external oblique fascia left to complete either a Bassini or Ferguson-Andrews operation. With this modification there seems to be very little to choose from between the Bassini and the Ferguson-Andrews methods.

We use the Bassini method wherever possible with cord transplantation, because this allows one to close the canal right down to the pubic bone. Often our lowest suture includes some of the fascia on the pubic bone.

But in patients who have relaxed, weak abdominal walls, we prefer the Ferguson-Andrews method because it gives an extra layer of fascia over the weak wall and gives additional support.

Postoperative care of our patients is simple. If local or spinal anesthesia has been used, very little interruption of eating is necessary, as the patients may have a soft diet a very few hours after operation.

Unilateral hernias are kept in bed for two weeks, and bilateral ones twenty-one days. In some cases, where the structures appear weak, they are kept in bed longer. But two and three weeks, respectively, are the ordinary periods of time in bed.

The patients are then allowed up and about,

told to return to duty six weeks after operation and advised to take up their regular duties gradually.

We are convinced that all hernias are the result of congenital, anatomical defects and are occupational rather than traumatic.

With this in mind, we make careful examinations of every patient who consults us with a hernia, and as a result we often find large rings, and in many cases an impulse on coughing. These are not hernia, but unless a repair of this condition is done, a large majority will result in hernia as a result of increased intra-abdominal pressure following the repair of any complete or incomplete hernia that exists. A striking example of this is illustrated by a case which came under my care.

At first, the patient presented himself for treatment with bilateral femoral hernia. These I repaired, and he left the hospital cured and returned to duty. About ninety days later he reported to the hospital with bilateral, incomplete inguinal hernia. These were repaired, and in six weeks he returned to duty and took up his regular duties with no difficulty. We saw him at irregular intervals and he seemed to be getting along nicely, so far as the femoral and inguinal hernia were concerned, but about eighteen months later he reported back to the hospital with an umbilical hernia. Still believing in us, he agreed to submit to any operation which cured the condition, and he is still in the service working regularly.

My advice is to repair the anatomical abnormalities that predispose to hernia following the repair of a hernia of the opposite side, and we shall save our patients much loss of time.

We make no claim of superiority in our surgical efforts, but we do believe that our low percentage of recurrences of hernia is due to well laid plans in handling the cases, and we recommend the following:

(1) Use Bassini (cord transplant) or Ferguson-Andrews with our modification of the Bloodgood procedure.

(2) Use spinal anesthesia, which gives a thorough relaxation during the operation; is attended by no nausea or vomiting, and absolutely does away with the postanesthesia delirium.

(3) Insist on long periods of rest in bed following operation.

(4) Avoid tension on suture line.

(5) Establish complete hemostasis.

DISCUSSION (*Abstract*)

Dr. B. F. Robinson, Lexington, Ky.—Being district surgeon of the Louisville and Nashville Railroad Company, I am confronted with many problems, as the essayist has said. I have some difficulty in determining which hernias are entitled to my services without pay and which should be paid for by the Louisville and Nashville Railroad Company. When I receive a report from one of my local surgeons that an employee has developed hernia, I refer the matter to the legal department, where a thorough investigation is made to determine whether or not the four postulates of the compensation laws of Kentucky have been satisfied. The employee must show that there was an injury resulting in hernia, hernia appeared suddenly, the hernia immediately followed the accident, and that it did not exist prior to the accident.

I have not felt that the danger of skin infection is sufficient to justify my giving up local infiltration analgesia for the repair of hernia, and unless there is some definite contraindication I repair all inguinal hernias under local infiltration analgesia.

The only difference between my technic in operating for inguinal hernia and that of the essayist is that after I have obliterated the canal by suturing the transversalis and internal oblique to Poupart's ligament, I close the aponeurosis of the external oblique beneath the cord and unite it to the fascia of the internal oblique; then the inner side of the aponeurosis is brought over and united to the outer surface of the opposite side. This gives me three firm layers of tissue over the site of the hernia. No patient yet has complained of tenderness of the cord because of its more superficial location and I feel that I have cured more hernias as a result of this type of cord transplantation.

Dr. Francis J. Kirby, Baltimore, Md.—Of the inguinal hernias we have two types: the direct and the indirect.

The direct hernia is the one most often met with as a traumatic hernia. It is simply a rupture through the abdominal wall, due to a thinning out and weakness of the structures.

In a direct hernia the spermatic cord (the vas deferens and vessels) is on the outer side of the sac. The sac is not a long and distinct one as a rule. The treatment is twisting the sac and cutting off the excess, if long enough, being careful not to include the urinary bladder or to injure it, as it is in this class of hernias that the urinary bladder is in danger. Then, reinforcing the abdominal wall, using preferably fascia according to the method of Gallie; or silk, for suturing.

The indirect hernia is frequently of congenital origin due to a small funicular process remaining in the closure of the peritoneum. Here the sac pushes on through the inguinal canal. The spermatic cord (the vas deferens and the vessels) is posterior, behind the sac.

If one will carefully dissect up the spermatic cord, he will find that the vas deferens turns downwards and backwards, behind the urinary bladder, while the blood vessels continue on upward behind the peritoneum.

The sac should be dissected free, and for over twenty-five years I have twisted the sac, tied it off high up, then cut away the excess, distal to the tie, when the tied end will at once retract well up away from the opening of the canal.

In all hernias the different layers of tissue should be

freed by dissection, so that there is no tension on the sutures when placed, as tension will cause separation.

If there is not sufficient tendon or fascia present to fill the defect without tension, fascia should be used, otherwise silk, as the suture.

Especial attention should be paid to the making of a solid, strong posterior wall by bringing together the conjoined tendon to Poupart's ligament, having the lowest suture to include a portion of Gimbernat's ligament.

It is surprising how frequently the structures can be brought together with no tension if the layers are freed sufficiently by careful dissection as one dissects down to the sac.

The spermatic cord is best brought out under the external fascia (the Bassini method) at the edge of the internal oblique muscle at the top of the canal and if the cord is anchored a little inward by a few fine silk stitches so that it will not lie directly over the line of the first row of sutures, and is brought out under the external fascia, which latter layer may or may not be quilted, a good strong wall of protection is obtained and has given most satisfactory results in our hands.

Inguinal hernias due to trauma are always associated with considerable pain, shock, frequently vomiting, with the appearance very early of swelling, congestion, ecchymosis and a lump.

Dr. R. A. Woolsey, St. Louis, Mo.—In a paper read before this Association in Dallas, Texas, in 1925, I contended that hernia should be considered as a disease due to special anatomical weakness, always a posterior canal wall defect. Even the unobliterated sac following descent of the testicle could be found in a high per cent of the dissections in cases where no hernia existed and it acted as a hernial sac only when the posterior inguinal canal wall was defective. Andrews modified Bassini's operation in that he retracts the internal oblique and transversalis muscle, suturing the transversalis fascia to Poupart's ligament. We believe this is inadequate, since the fascia is normally thin medially to the ileac vessels and must be anatomically defective laterally, else hernia would not have developed. It is our plan to suture the rectus sheath to Poupart's ligament, the lower stitch as close as possible to the pubic spine, the upper stitch carrying the internal ring higher than it originally was and each suture less than one-half inch apart, making in all seven or eight interrupted sutures from the rectus sheath to Poupart's ligament. The lateral portion of the split fascia is carried under the medial portion and sutured, using its full width; the medial portion then is carried over and sutured to Poupart's ligament, all knots being outside the fascia. All sutures are interrupted, leaving the posterior wall with three thicknesses of fascia. The cord is left under the skin and fat as its only covering, apparently making ample protection, since we have not heard to the contrary in a number of hundreds of cases.

The railway employee is becoming educated to the fact that hernia is not the result of injury, but of an anatomical defect.

THE MECHANISMS OF THE CORPUS STRIATUM AND THE CEREBELLUM IN MUSCULAR ACTION*

THE MECHANISM OF VOLUNTARY MUSCULAR ACTION

By JAMES GREENWOOD, M.D.,
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The following case started this study:

G. H., a white boy, aged 16, in 1919 had a mild case of epidemic encephalitis with temporary recovery and about six months later developed the Parkinsonian syndrome which rather rapidly progressed until he was in a serious state.

He was practically helpless, could not button or unbutton his clothes, could not feed himself, could not even raise a glass of water to his lips, except very, very slowly, and with some tremor.

In that condition he came to the hospital one Sunday afternoon and he was encouraged to try to do these things, but could not. Boys about his age were playing tennis out on the lawn, and to test a statement made by Dr. Frederick Tilney, he was told to go out there with them and play. He did this as if nothing were the matter with him, running after the ball, hitting it straight and hard, and had as much use of himself as either of the other boys he was playing with.

Here we meet a peculiar disturbance of voluntary muscular action, practically a complete inability to execute certain kinds of movements, and at the same time no interference with other kinds, using the same muscles at one time, unable to use them at another. A careful study of these movements shows that the kind he cannot use are those which seem to be guided by sensations of touch and various afferent sensations, from tendons, joints and muscles. The kind he can use are those which are guided by sight and feelings which determine relations of distance and direction, and rapidity of action. A person so affected has a perfectly normal corticospinal tract (as all such cases show on postmortem) yet he is unable to execute many movements which he could easily do before he had this disease. In these cases there is a disease of the lenticular nucleus, and we must realize then that a normal lenticular nucleus is necessary for many muscular movements of the type mentioned above, which he cannot do now, on account of its disease. We then have a large group of movements of a certain type which are normally consciously performed, and which cannot be set in action if the lenticular nucleus is diseased.

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The impulses which seem to guide this type of movement are the ones going to the thalamus, and as the thalamus sends many impulses to the lenticular nucleus, they must be for the purpose of stimulating the cells of the lenticular nucleus, so that impulses will be sent from there which are needed for this type of muscular action.

There is a definite tract going from lenticular nucleus to the red nucleus and a tract going from the red nucleus to the cells in the anterior horns, the rubrospinal tract.

This tract is of itself not sufficient to produce muscular movement for the corticospinal tract must also be intact before we can have voluntary muscular movements.

For the performance of this muscular action it is necessary that two efferent tracts be intact, first the corticospinal tract, and second, the thalamo-lenticular-red nucleus-rubrospinal tract, or cerebello-red-nucleus-rubrospinal tract. To have voluntary muscular action both of these tracts must function, and what we want to know is what each tract does, that is, what do the impulses do that travel over each tract. This special case was rather extraordinary in the pronounced effect on one type of muscular movements, with no effect on the other. However, a study of paralysis agitans as well as the numerous cases of the paralysis agitans syndrome seen as a sequel to encephalitis show that we have more or less limitation of many movements, yet no disease of the corticospinal tract, but a definite disease of the corpus striatum and especially the lenticular nucleus.

We have, then, a disease frequently seen, in which there is a loss of many muscular movements and in which there is a disturbance in this thalamo-lenticular nucleus-red nucleus-rubrospinal tract. Trying to solve this peculiar question, we decided that the following hypothesis gives a reasonably satisfactory solution and explains many other characteristics of muscular action.

First.—Many nerve cells have a double innervation which is necessary if they are to function by sending impulses to other nerve cells or to muscle. One impulse goes to a cell to put it in a receptive state so that the other impulse can stimulate it so that it sends out an impulse. In other words, one impulse sensitizes it so that another impulse may stimulate it into action.

In this way impulses carrying all kinds of sensations go to the various receptive centers all the time and sensitize these cells, so that if another impulse goes to them they are stimulated to send out impulses elsewhere. In this way choice of action is determined and mechanisms of action are developed by constant repetition until the various forms of action as met with have been produced.

Second.—There are two great systems, closely related and yet performing entirely different functions: the corticospinal system which supplies the stimulus for action and the rubrospinal system which acts on the lower motor neurone cells, sensitizing them to be acted upon by the corticospinal system, that these lower motor neurone cells must be sensitized before they can be stimulated to action.

The rubrospinal system is controlled from two sources: (a) the cerebellum, which is the organ for sensitizing for direction, distance, relative position, antagonistic muscles, and speed of action; and (b) the thalamus and corpus striatum for sensations such as touch, pressure, pain, conscious proprioceptive and relative position of parts of the body itself.

Besides this, however, there is the factor of conscious control and choice of movement, and this must enter into the action. It is not enough then for these various afferent impulses to go to the thalamus and the cerebellum, but at the same time specific impulses must go from the cerebrum, and that part related to the production of consciousness, to the thalamus and the cerebellum, and these impulses must sensitize only those cells in the thalamus and in the cerebellum which are needed eventually to sensitize the proper anterior horn cells through the rubrospinal tract, so that the corticospinal tract can throw them into action.

You see, then, that for normal muscular action we must have the following factors working together:

(1) Afferent impulses going to the thalamus cells.

(2) Efferent impulses from the cerebrum going to some of these thalamus cells.

(3) From certain cells in the thalamus that have received impulses from both these sources impulses go to the corpus striatum, and especially the lenticular nucleus.

(4) From the lenticular nucleus, those cells so stimulated send impulses to the red nucleus, and from there through the rubrospinal tract to the proper cells in the anterior horns.

(5) Afferent impulses to the cells in the cerebellum.

(6) Cerebral impulses to certain of the cerebellar cells.

(7) From these cerebellar cells that have received impulses from both sources, impulses go to the red nucleus and then by the rubrospinal tract to the proper cells in the anterior horns.

(8) And finally there must be proper impulses from the Ronaldic area to the cells in the anterior horns already sensitized so that they may be thrown into action.

This seems to be a reasonable explanation of how all these various parts of the nervous system contribute impulses needed for a muscular contraction, just what they do and how they are related to each other. We know that they are all essential to muscular action both voluntary and automatic. In fact, all automatic muscular movement was at one time voluntary and has become largely automatic through habit and repetition, though if one studies it carefully some quality of voluntary movement can always be found.

Sensitization of different sensations is a very important function of the nervous system. With it we select the sensation we wish to notice and the important one, ignoring all the others, even though they may be much stronger, and in this way we choose the sensation to which we wish to react.

There is also an unconscious sensitization with sensations that do not appear in consciousness, as occurs with most cerebellar activity, and is a large part of sensitization for muscular action. This property of sensitization as a factor of function is widespread throughout the nervous system.

In such actions as buttoning the clothes, the necessary movements are preceded by sensitization of the proper lower motor neurone cells in the anterior horns, or similar areas of the medulla or pons, by impulses of touch, feeling, muscle sense, and so on, through the thalamus-corpus striatum-red nucleus-rubrospinal tract.

At the same time there must be sensitization of the proper cells in the thalamus through the cortico thalamic tract, since in this way we consciously choose the type of action we wish to use. Each succeeding movement is sensitized, for by the afferent impulses of the preceding movement, and other sensations as touch, pressure, pain, with the same cerebral activity guiding and choosing. In an act such as hitting a golf ball sensitization as to distance, direction and strength of blow is guided by sight and position of the body, and all this would seem to be mainly the cerebellar factor, while the grasp of the club, firmness and muscular sensations would mostly come through the thalamus and corpus striatum.

However, in the case reported of the young man who could do very little slowly, yet who could play a good game of tennis, it would seem that with a good deal of damage of this thalamo-lenticular-red nucleus-rubrospinal tract, movements very similar to hitting a golf ball could be done with precision and skill.

It seems very probable, however, that some of this thalamo-corpus striatum-red nucleus tract was functioning, for in these cases most of the pathology is found in the lenticular nucleus. Therefore, the rest of the corpus striatum is normal and its function not disturbed. And its functions must be to distribute certain impulses received from the thalamus to the red nucleus, and so on to the anterior horn cells. In most movements it would seem that sensitization is carried on through both the thalamus and the cerebellum.

As a further factor in this hypothesis it is suggested that the strength of a contraction depends on the number of muscle fibers which are made to contract and distance of movement on a similar state. A weak movement uses only a few fibers, a strong one many; a short movement uses a few fibers, a long one many.

It seems that these two effects, strength of contraction and distance, should be the result of power and effort, but such is not the case at all. They depend on the number of muscle fibers that can be made to contract at will, through this mechanism as described. In this way is explained how training not only produces a great improvement in coordination, but also increases the strength of movements by bringing into the contraction more and more muscle fibers. Of course in this there is an improvement in the general nutrition of the muscles involved and some hypertrophy of its fibers, but the development of the mechanism which uses more fibers would seem to be of the greatest importance.

Now, it is an accepted physiological fact that "The individual muscular fiber contracts as does that of the heart muscle, that is, when it contracts it does all that it can do." "All or nothing"—there is only a maximal contraction, therefore variations of strength of a muscular contraction must depend entirely on the number of fibers that can be made to contract, and it can

be readily seen that distance of movement depends on this same fact.

From an anatomical standpoint, then, it would be expected that a small muscle which had a great many movements would have a much larger nerve supply in proportion to the size of muscle than one that did not. A very good illustration of this is that of the sixth nerve going to the external rectus muscle of the eye, nearly as large as the muscle. In reading if one looks at a letter, then moves the eyes so as to focus on the next letter to that one, it requires a definite muscular contraction to accomplish this action; and to focus on the next and the next, on across the page, gives one an idea of how many separate movements this muscle can make, and to make all these different movements a different number of muscular fibers must be made to contract each time so there must be a great many nerve fibers going into this muscle to bring this about.

This fact, that the contraction of a muscle fiber is "all or nothing," is very important in understanding muscular action. It means that for a certain movement which does a certain action there is a very definite number of muscle fibers of various muscles used together and in succession to accomplish that act. It would seem that each repetition of the act would use just about the same group of fibers of these same muscles in the same order. It would also seem probable that to bring this about there would be definite groups of nerve cells, acting together and successively corresponding to the action performed.

This definite and fixed pattern of response of both nerve cells and muscle fibers, to bring about a specific muscular act, must be true, for it explains all the various facts which are known, and which cannot be explained in any other way. A careful study of the actions and behavior of animals and insects will convince one of the fact that their mechanisms of action are definite and specific groups of nerve cells and muscle fibers so related that their activity is a definite and specific action.

Every voluntary movement is guided by an idea which sensitizes through the cerebellum and thalamus the proper cells in the anterior horns, and they are then discharged, that is, stimulated to send their impulses into the muscles by impulses coming from the cells in the Rolandic area.

At first this idea of action is in the forefront of consciousness, but with time and practice it becomes less and less conscious until it seems as if consciousness were not controlling it in any way, and that consciousness were concerned with something else. In this way acts become automatic, but if these are studied carefully this conscious factor can always be found.

With the development of a movement by constant use, the conscious idea which was at first necessary for its production becomes less and less conscious until there remains only a vague consciousness which is all that is needed to supply the conscious component of the action. You can call this "the conscious equivalent of the idea," for it acts just as the idea did when it first sensitized the cells of the thalamus and the cerebellum as its part of the mechanism of action.

As various mechanisms of action are coordinated into one complex action, as running after a tennis ball and hitting it with a racket, the various "conscious components" of these actions seem to be coordinated into a series of "conscious equivalents," each becoming active in its place and so bringing about the desired activity. It would also seem that in such an action many of these "conscious equivalents" disappear entirely from consciousness, but the cells which brought about the necessary sensitization are now set in action by other related "conscious equivalents," which can stimulate their activity and so in this way the action is more or less automatic.

In this way one conscious idea may control a good many "conscious equivalents," and these in turn control those cells previously associated with consciousness, but which now usually function unconsciously, and whose action is just the same as it was before, when the action was consciously done. As with a man walking, the idea of where he is going and the other ideas as speed required, control all the subordinate ideas or conscious equivalents, so that nothing but the primary ideas of where, why and speed are in consciousness.

In walking, each successive muscular action must be learned consciously (though the complete mechanism is already built into the nervous system at birth, and in animals its use is quickly acquired) in man, and all coordinated consciously with a cortical pattern. Then another idea of activity as "going somewhere" sensitizes this "walking" cortical activity or mechanism, and now the cortical "walking" mechanism is carried on unconsciously and the "going somewhere" mechanism is consciously

active. Later on the "going somewhere" mechanism may be submerged in the unconscious and some other cortical mechanism become the conscious one, all others being more or less unconscious.

In writing I no longer have to think of the movements to be made, but only of the letters, or the words, and finally only of the necessary "conscious equivalents" which can carry on to completion the full mechanism of writing what I wish. All this had to be learned, and it took a long time to develop it. Each movement of the letters had to be developed, controlled by consciousness, and each of these primary movements coordinated with others, and so the letters built up, and then words formed, and all coordinated so that it became practically automatic.

These ideas of the movements which are combined to form letters develop their mechanisms in a rather definite and fixed manner and as a result one's handwriting becomes peculiar to himself and remains about the same as a rule with very little change, and even when one is dissatisfied with his writing and tries to improve it, it still remains much the same as he developed it at school. My handwriting is much the same as it was twenty or thirty years ago, although I have worked to improve it. Most movements have this same quality of remaining very much as learned, and hard to improve.

I wish to emphasize the importance of consciousness as a necessary factor of every movement. At first it is very prominent. With practice it becomes less and less conspicuous, but nevertheless is essential even when the movement has become automatic, when there is just a consciousness of something, vague and indistinct, yet the equivalent of the intense consciousness of the early stages of learning the action, and performing the same function that this intense consciousness performed as its part of the action.

A careful study of voluntary muscular action shows it to be a very complicated mechanism and reveals many interesting phenomena, some of which are as follows:

(1) A voluntary muscular action in man has to be learned by trial and error over a very variable period of time. Most of what an animal normally does has been learned throughout the period of its race, but after training by man it can learn to do many things which are entirely new.

(2) Any new movement also has to be learned, but may be more easily learned if certain other movements that have previously been well learned can be partly used in its performance. For instance, a man who has chopped wood, used a hoe a good deal or played baseball or tennis, can use some of these movements in hitting a golf ball.

(3) It is much easier to learn to do something if in doing it you can use movements that have already been learned than it is to do something in which none of these previously learned movements can be used. If a right-handed person tried to learn to play golf left-handed it would be much harder, because there would be very few learned movements that could be used, while if he learned it right-handed many of these movements could be used.

(4) All voluntary muscular movements consist of successive contractions of groups of muscle fibers of different muscles in various parts of the body, with various durations of contractions.

(5) These different contractions of different muscle fibers are controlled by sensations of many kinds received through sight, hearing, feeling and the many afferent impulses from muscles, joints and tendons.

(6) It is practically unknown to the individual mind what members or movements are used in a given act such as, for instance, buttoning or unbuttoning his clothes, putting on a tie or collar. We do not know what or how much we do with the right hand or the left, but if we watch ourselves closely in doing something of the kind, we see that each contraction produces sensations which prepare for the next part of the movement, and it in turn for the next until the act is complete. As a rule these successive movements are performed unconsciously and we say that the act is automatic, but there is a voluntary element in every one, and so it is not completely automatic.

(7) This shows that voluntary muscular action is not intentional contraction of muscle fibers, but is the utilization of a mechanism, developed by trial and error, on an already formed neuromuscular system as has been already described.

(8) If we try to do something that we have never learned to do, such as writing with the left hand, we see at once that it is impossible to make the muscles do what we want them to do. We do not really know just what we want them to do, what muscles to use, what directions we want our fingers to take, or how to make

the next one. We can do it easily with the right hand, for it has already learned, but with the left it has not been learned, therefore does not exist.

(9) It is a very interesting fact that after a muscular movement has been learned, it is very much of a fixed type and peculiar to that individual and remains rather constant throughout his life. We see this every day in handwriting, the way a man walks, or plays golf or does almost anything.

When we examine the structure of the nervous system, both gross and microscopic, study its function as related to muscular action and the physiology of muscle and see the results of various pathological states affecting the nervous system, we find very much information in support of this hypothesis, and so far as I know nothing against it. The anatomical structure of the nervous system fits in fully with this hypothesis.

The cerebellum receives many nerve tracts from a variety of sources to be used in the coordination of muscular actions. Also from many parts of the cerebral cortex a great many nerve tracts go to the cerebellum for a similar purpose, and from this double action impulses go through the dentate nucleus to the red nucleus, and then to the anterior horn cells through the rubrospinal tract.

In this way a pattern of action is sensitized for, and each successive movement sensitizes for the next one, or for fixation of a joint, or antagonistic action as the necessary part of the action. This explains the use of the cortico pontile tracts which are very large and carry an enormous number of impulses.

The thalamus receives impulses of touch, pressure, posture of a limb, temperature, pain, and also a large number of fibers from many parts of the cortex, and from the thalamus. Tracts go to the corpus striatum and lenticular nucleus especially, and thence to the red nucleus and so on, through the rubrospinal tract to the cells of the anterior horns. In this way ideas or their "conscious equivalent" control muscular actions through the cerebro-thalamic and the cerebroponto cerebellar tracts.

The vestibular tracts also go to the cerebellum and sensitize certain cerebellar cells with which they are connected, so that through these cells the necessary muscle fibers needed to maintain equilibrium may be used as needed, but even here it would seem that both the corticospinal and rubrospinal systems are used.

All this fits in perfectly with this hypothesis and is a reasonable explanation of the function of the cerebellum and corpus striatum. Neither has any direct effect on muscular action that we know of, and they have no effect whatever when the corticospinal tract is destroyed by injury or disease, so then their effect must be indirect, and we know that whatever it is it is absolutely necessary, so the probability that a sensitization of cells is necessary before a stimulus can act on them is very reasonable. We are taught that the corpus striatum controls automatic movements, but this cannot be true, for in the case mentioned all this boy's movements when he was playing tennis were automatic, yet they were in no way affected by his diseased lenticular nucleus. Yet the other automatic movements as mentioned were affected tremendously and the reason seems to be explained by this hypothesis.

In diseases of the cerebellum, its tracts and of the corpus striatum, there is a marked disturbance of voluntary muscular action. Since the epidemic of encephalitis we see many cases of paralysis agitans syndrome, with marked disturbance of muscular action. They have a variable degree of weakness, which can be explained on the basis that there are fewer cells in the anterior horns that can be sensitized, so fewer muscle fibers can be made to contract, and therefore the contraction is weaker. Inability to do many things which previously could be easily done is to be explained by disease of certain cells of the corpus striatum, whose functional activity is required to sensitize in the pattern of action cells of the anterior horns, whose activity is required if the action is to be completed in a coordinate manner.

That this is not due to any type of paralysis is shown by the peculiar dissociation of muscular actions to which Dr. Frederick Tilney, of New York, called attention. Although these patients executed slow movements very poorly, they could still execute rapid movements with strength and skill, as was described in the case mentioned. This can be explained on the basis that all the needed sensitization of anterior horn cells can still be produced through the cerebellorubrospinal tract, which in this case was intact. When the patient's movements were guided through the cerebellum by sight, feelings of relative position and afferent tracts to the cerebellum both from the periphery and the cerebrum, then he had a normal pattern of action functioning in a perfectly normal manner. In

many of the postencephalitic complications there is more or less involvement of the dentate nucleus of the cerebellum and in these the picture is more complicated and the patient much more helpless. This viewpoint encourages the hope that the helpless state of these patients may often be much improved by training, so that the cerebellar control may be greatly improved and develop use again of many muscles. In disease of the cerebellum the symptoms encountered vary with the part which is involved.

In lesions of the vermis there is disturbance of equilibrium and an inability to stand erect well or walk in a normal steady manner. This would seem to be due to the use of the wrong amount of muscle fibers of various muscles ordinarily used in such actions, because some of the cerebellar cells whose activity is required to sensitize the proper cells of the anterior horns are unable to do so, and so the pattern is distorted and the action in proportion to it. There is usually resulting from this condition a false sense of movement and the cerebral attempt to correct this distorts the action.

It is not the purpose of this paper to discuss equilibrium, but only the effect of cerebellar control of voluntary and automatic action. In disease of the cerebellar hemisphere there is a disturbance in the coordinate action of the arm or leg or both of that side of the body; there is an incordination in which the limb does not act as its owner wishes, but in a clumsy manner, either too far, or not far enough, to the wrong side, or is too weak or too strong. In other words, it is the guiding for distance, position, relationship to various objects and direction which is disturbed. There is also found a variable degree of weakness, which is to be explained as an inability to sensitize as many of the cells of the anterior horns that had previously been developed in the pattern of a given action so that when this action is attempted fewer muscle fibers can be brought into action, and therefore it is weaker. In disease of the cerebellar tracts we find somewhat similar symptoms. In disease of the afferent sensory paths, especially the posterior columns of the cord, we find as in locomotor ataxia, weakness and incoordination, due to inability to use the developed pattern of a given action. Some of the receptive cells, especially of the thalamus, do not receive impulses which normally they previously received in a given activity, and do not send impulses to the lenticular nucleus or other parts of the corpus striatum, and on to the anterior horn cells. A further interesting observation in regard to this hypothesis is the fact that many of the nerve cells show a double innervation. In the cerebellum, for instance, the Purkinje cells have this double innervation, the ascending nerve fibers can be seen to spread out in contact with the dendrites of the Purkinje cells, while the fibers from the basket cells are seen forming a network around the bodies of the same cells. (Figures seen in Herrick's "Introduction to Neurology," Figs. 14-15-16, pp. 52-54).

NEWER ASPECTS OF SO-CALLED PTOMAINE POISONING*

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The present-day conception and classification of acute illnesses caused by the ingestion of peccant foodstuffs is based largely upon scientific investigations and observations that are credited to workers in the fields of bacteriology, toxicology, experimental medicine, and epidemiology. For many years, indeed until relatively recently, any acute gastro-intestinal disturbance resulting from the consumption of contaminated food was referred to as "ptomaine poisoning." Even today, in spite of the scientific data which are available, there is still a prevailing tendency indicating scanty knowledge of the important subject of food poisoning by the medical profession in general, for physicians to prefer this antiquated expression, one which signifies a diagnosis of convenience and a handy refuge from undetermined etiology.

The idea that ptomaines were capable of causing disease was based upon the early observations that certain aqueous extracts of decomposing protein materials were poisonous, and often produced symptoms, when injected into the circulation of experimental animals. A ptomaine (Gr. carcass) may be defined as a basic alkaloid formed as a late degradation product in the process of decay of animal or vegetable proteins. In other words, ptomaines cannot be formed in food until it is far too putrid to eat. Experimentation with these secondary protein cleavage products, and interesting observations, have modified our view regarding their reputed toxicity. It has been demonstrated that relatively large amounts of most ptomaines can be ingested by

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experimental animals without producing symptoms of acute gastro-enteritis, and it is common knowledge that in some countries the inhabitants have developed queer tastes for, and apparently thrive on, "high" meats and other protein foods, such as buried eggs and fish, which show degenerative changes.

The more recent investigations of illnesses which were thought to have been caused by ptomaines have shown conclusively that specific micro-organisms, or their toxic growth products, were responsible. As bacteriological data have accumulated from the studies of food poisoning outbreaks, our attention has been gradually focussed more and more on the infection of food, and less and less on the decomposition of food as the cause of such outbreaks. In the light of the evidence, the expression "ptomaine poisoning" has no justifiable place in a modern discussion of food poisoning, and should be discarded if we are to maintain accuracy in diagnosis.

In a broad sense the term "food poisoning," replacing the expression "ptomaine poisoning," signifies an acute illness caused by the ingestion of food containing harmful substances, and includes illness caused by:

(1) Naturally poisonous foods (for example, poisonous mushrooms, certain varieties of berries, ergot, certain tropical fish, and, under certain conditions, mussels).

(2) Mineral and organic poisons contained in food (for example, lead, zinc, and copper salts, arsenic, sodium benzoate, alkaloid poisons).

(3) Poisons generated in foodstuffs by bacterial activity before they are consumed (true food intoxication due to toxins, for example those produced by *B. botulinus* and the Salmonella organisms).

(4) The invasion and growth in the body of pathogenic organisms contained in food (true food infection due to organisms of the Salmonella group).

Disturbances due to avitaminosis, food allergy and animal parasites, and such well-defined disease entities as bacillary dysentery, typhoid fever, cholera, undulant fever, intestinal tuberculosis, streptococcal sore throat and diphtheria are not properly considered instances of food poisoning, although they may be contracted by the ingestion of foods and liquids.

Inasmuch as the majority of food poisoning outbreaks have been found to be due to certain pathogenic organisms, and/ or their toxic growth products, and since the chief interest in food poisoning today lies in its solved and unsolved bacteriological aspects, this discussion will be restricted to a consideration of bacterial food poisoning.

The first bacteriological contribution to the modern knowledge of food poisoning came in 1888, when Gaertner studied an outbreak of meat poisoning and isolated from a fatal case, and from the animal which furnished the meat, the organism which bears his name. This organism was later designated as *B. enteritidis.*

Since then this organism, and a group of closely allied organisms, have been found in the intestinal tracts of various birds and animals, usually associated with acute intestinal disease in these animals. Moreover, certain members of this group of interesting organisms have been recovered repeatedly in a great many outbreaks of acute food poisoning, and their causal relationship to food poisoning has been definitely established.

More than 20 varieties of these closely related gram-negative, actively motile organisms have been described, but not all of them are capable of causing disease in man. They constitute the so-called paratyphoid-enteritidis, or more properly the Salmonella group of organisms; they are intermediate between *B. typhosus* on the one hand and *B. coli* on the other. *B. aertrycke, B. enteritidis, B. suipestifer, B. paratyphosus* A and *B, B. abortus equi, B. typhi murium,* and *B. psittacosis* are the better known members of the group, and the first three mentioned, namely, *B. aertrycke, B. enteritidis* and *B. suipestifer* have been found to be the most important members of the group, insofar as bacterial food poisoning is concerned.

Other organisms, particularly members of the dysentery group, the streptococcus, *B. proteus, B. cloacae,* and the *Staphylococcus aureus,* have been isolated in a few food poisoning outbreaks and have been held etiologically responsible by some investigators. Doubtless they account for a small percentage of outbreaks. Statistics show that approximately 70 per cent of the outbreaks recorded are caused by the Salmonella organisms. It should be emphasized, however, that there still remain many unexplained cases of illness attributed to foods, and it is not at all uncommon for no etiological agent to be demonstrated in the study and investigation of an outbreak. Savage states that in approximately 25 to 30 per cent of the outbreaks thus far investigated the causal factors have not been satisfactorily explained. A review of the recorded data

regarding the etiology of bacterial food poisoning indicates plainly the dire need for further research in this open field.

The epidemiological and experimental studies with the Salmonella organisms have yielded important observations, some of which appear to be more or less contradictory. The majority of investigators have found that *B. aertrycke* and *B. enteritidis* are more frequently isolated in outbreaks of food poisoning than other members of the group. The very extensive studies of Savage and his coworkers indicate that these organisms are capable not only of invading the body tissues and causing infectious disease, but also of producing a heat resistant substance which is not destroyed by the temperature ordinarily employed to effect sterilization. It is his contention that acute illness developing within two to three hours after eating contaminated food is caused by these toxic irritants; that acute gastro-enteritis manifesting itself six to eight hours or longer after ingestion of infected food is true food infection, the organisms having entered the body, multiplied and invaded the tissues in sufficient numbers to produce disease. The observations of other investigators tend to support this view. Geiger and Meyer, and Branham, Robey and Day found that a sterile *B. aertrycke* filtrate, autoclaved at high temperature for several minutes, quickly produced symptoms of acute food poisoning when given to experimental animals orally. Pryer found agglutinins for *B. aertrycke* and *B. suipestifer* in the blood of animals which received sterile injections prepared from corned beef which had produced severe acute gastro-enteritis in four laboratory workers. Contrary to these observations, Dack, Cary and Harmon were unable to produce symptoms of food poisoning by feeding relatively large doses of sterile polyvalent *B. aertrycke* and *B. enteritidis* filtrate to a group of twenty-four persons. These findings suggest rather strongly that there is considerable variation among the different strains of organisms, and that in individual strains, from time to time, under different growth conditions, there may be toxigenic variations which are responsible for the discrepancies mentioned. There seems to be little doubt that *B. aertrycke, B. enteritidis* and *B. suipestifer* are capable of producing a soluble, thermo-stabile substance of sufficient potency to cause acute gastro-intestinal irritation in man.

There is some divergence of opinion regarding the identification of the members of the Salmonella group. *B. paratyphosus B* and *B. aertrycke* are so much alike that they can be differentiated only by means of agglutination and absorption tests; some workers consider them identical organisms. In spite of this close and confusing relationship, however, the work of Savage and White shows rather definitely that they produce different diseases in man. They regard *B. paratyphosus B* as the etiologic agent of paratyphoid fever, a specific disease entity, and are able to adduce no evidence that *B. paratyphosus B* ever caused a food poisoning outbreak; likewise that *B. aertrycke* ever produced paratyphoid fever. Jordon regards *B. aertrycke* as a separate and independent organism both culturally and immunologically; his studies indicate that this bacterium is the most frequent cause of acute food poisoning.

The source or sources from which food is contaminated remains to a considerable extent a matter of conjecture. It has been mentioned that the Salmonella organisms are found in the intestinal tracts of birds and animals. Cruickshank points out that *B. enteritidis,* which is frequently found in cattle, and *B. suipestifer,* frequently found in pigs, cause disease in man relatively infrequently, and that *B. aertrycke,* the chief offender in acute food poisoning in man, is seldom found in domesticated animals. In some cases the animals from which the meat products were derived have been found to be infected with Salmonella organisms. In other cases contamination of the meat after slaughter by human carriers, insects, rats and mice and unclean butchers' instruments and kitchen utensils has been suspected.

As regards the vehicle of infection or intoxication, Savage in a study of 121 outbreaks of food infection occurring in Great Britain from 1919 to 1931, found minced meat foods to be the vehicle of infection in 21 instances; meat pies in 16; milk and milk products in 12; canned food in 8; eggs in 7; fresh meat in 8; fish in 5; and hand-manipulated foods in 10. The majority of these outbreaks occurred during the summer months, indicating that the higher temperature of these months would naturally be conducive to rapid bacterial growth. Seventy-six of them were caused by *B. aertrycke;* 14 by *B. enteritidis;* 7 by *B. suipestifer.* In a study of 70 outbreaks of food intoxication, canned foodstuffs were incriminated in 58 instances (83 per cent). These outbreaks, thought by Savage to be due to preformed heat stable irritants contained in the canned food, were found to occur at any time during the year.

The Salmonella organisms grow readily and rapidly in foodstuffs, and, as a result of their growth, so little change is effected in the food that it is not detectable by any of the senses. Hume states:

"One of the greatest fallacies of even trained mess personnel is in thinking that in food infection the food is changed in appearance, taste, or odor. Such is not the case. The most dangerously infected meat may have no unpleasant smell at all, may not have a disagreeable taste, and in appearance may be just the same as the best of meats."

Clinically illness caused by organisms of the Salmonella group is characterized by a very sudden and explosive onset, often within two hours, though as late as twenty-four to thirty-six hours, depending on whether the preformed heat-resistant toxins, or the living organisms are responsible, after eating the affected food. Nausea and vomiting, severe abdominal cramps and violent purging (associated with chills, headache, thirst, fever, nervousness, prostration, drowsiness, coma, and sometimes death) constitute the cardinal symptoms. The severity of an attack depends to a large extent upon the virulence of the organism, the potency of the toxin, the patient's resistance and the amount of food ingested. The mortality in this type of acute gastro-enteritis is stated to be about 2 per cent; the majority of victims recover within twenty-four to forty-eight hours after the onset of symptoms.

The discussion of food poisoning thus far has taken into consideration only the acute gastro-intestinal disturbances caused by bacteria, and their irritant growth products. There is another important type of food intoxication which affects a different system.

In 1895, von Ermengem, while investigating an outbreak of food poisoning caused by ham, isolated an organism which he named *B. botulinus* (*Cl. Botulinum*). This organism, a saprophytic spore-bearing anaerobe, produces a soluble toxin when grown in a nitrogenous medium. The organism and its spores are killed at a temperature of 110° C. in 15 minutes; the toxin it produces is destroyed at a temperature of 75° C. in 10 minutes. Three types of *B. botulinus* have been described; approximately 90 per cent of the outbreaks caused by this organism have been caused by *Type A; Types B* and *C* are relatively unimportant. A polyvalent antiserum prepared from the three types is now available, and is useful therapeutically if employed early.

Clinically, disease produced by *B. botulinus* differs from that caused by the Salmonella organisms in that its toxin affects the central nervous system and does not act on the gastro-intestinal tract. Symptoms begin 18 to 36 hours after the ingestion of the poisoned food, with fatigue, headache, dizziness and muscular weakness. Nausea and vomiting do not ordinarily occur; the temperature is subnormal and there may be constipation. A burning thirst, difficulty in swallowing due to muscle paralysis and attacks of coughing due to thick tenacious mucus are followed by respiratory failure and death in from 50 to 100 per cent of the cases described. The outbreaks described have been largely sporadic, and in the majority of instances the source of the toxin has been traced to products that were canned at home.

The correct differential diagnosis of acute food poisoning can be made only with laboratory aid. Since implicated food materials often are of perishable character, immediate examination should be required in any outbreak. The procedures employed in this investigation will depend to a large extent on the type of data furnished. In the case of suspected food infection, appropriate and selective bacteriological studies should be made; the cultural procedures suggested by Koser are recommended. It should be remembered that agents other than bacteria can cause food poisoning. For this reason the bacteriologist should not feel obligated to attach especial significance to any organism which happens to be conspicuous.

In addition, bacteriological studies of the feces, urine and vomitus of affected individuals should be carried out. In fatal cases, the viscera should be examined and cultured. In Salmonella food infection the infecting organism is likely to be found in the feces only during the first few days of illness. It is truly a "hit-and-run" organism. Fermentation and agglutination tests will establish its identity. Agglutinins in the blood serum have been shown to develop in 10 to 14 days after the onset of illness; they remain in the blood a relatively short time only. The presence of Salmonella agglutinins in dilutions as low as 1 to 40 is considered to be diagnostic of disease.

In cases of food intoxication, proof of the nature of the causal factor is best obtained by means of animal inoculation. In botulism an injection of filtrate prepared from the suspected food material will reveal the specificity of the toxin provided a control animal is protected by a concomitant injection of polyvalent anti-botulinus serum.

Acute food poisoning is a subject of growing economic importance, and in this present-day maze of industrial complexities necessitating the acceptance of responsibility and liability on the part of the preparatory and distributory agencies handling foodstuffs instances of food poisoning not infrequently have medicolegal aspects. For this reason, and for the sake of accuracy in diagnosis, it behooves every physician who is treating a case of food poisoning to make an early detailed study of the case, and to collect certain pertinent evidence whenever and as soon as possible. Inquiry regarding all foods ingested during the preceding 24 hours, with particular emphasis placed on meats, meat products and all protein foods, often yields important clues. Frequently the patient may ascribe an acute digestive upset to a certain food, usually the last one eaten, on the basis of prejudice. Such an opinion should not tempt the physician to be satisfied with confirming the patient's diagnosis.

The prevention of diseases caused and conveyed by food materials resolves itself essentially into a matter of thoroughly familiarizing those entrusted with health guardianship as to the exact nature of their respective responsibilities. It is the function of the laboratory worker to investigate, demonstrate and explain the pertinent facts of food poisoning. Laboratory aid in the study and diagnosis of disease can reach a high point of service in food infection and food intoxication; its success depends to a large extent on the attitude, alertness and cooperativeness of the general practitioner.

To the public health officer and veterinarian falls the big responsibility of inspecting foodstuffs, particularly meats and milk and their products. It is not an easy matter for sound food materials, protected from exposure, kept clean and cool in clean premises, and handled minimally, to become contaminated. The proper use of refrigeration and pasteurization, and the time element and distribution of heat in cooking solid substances, all have a very direct bearing on bacterial growth. The public health officer further plays an important role in maintaining rigid standards of cleanliness in both marketing and eating establishments. The detection of carriers is accomplished chiefly through this type of activity.

It is the solemn duty of the practitioner of medicine to become so thoroughly familiar with the various aspects of food poisoning that informed alertness on his part will result in the prompt collection of data and materials to the end that laboratory investigation of any food poisoning attack can be early instituted. Absolute diagnosis is attained in this way only.

Hewlett urges that anyone undertaking to investigate an outbreak of food poisoning should attempt to obtain information (1) regarding the nature of the causative agent, whether bacterial or otherwise; (2) the nature of the vehicle of infection or intoxication; (3) the reservoir from which the infection is derived if bacterial; (4) the path by which the bacterial agent is conveyed from the reservoir of infection to the vehicle.

More will be known of the natural habitat and behavior of the organisms capable of causing food poisoning only when attacks are reported sufficiently early for proper bacteriological and toxicological examinations of the incriminated food. Clues regarding the source and evolution of bacterial food poisoning may thus be obtained.

Acute food poisoning might well be made a compulsorily reportable disease in all large cities.

SUMMARY AND CONCLUSIONS

(1) In the light of available scientific data regarding the etiology of food poisoning, there is no justification for the continued use of the expression "ptomaine poisoning."

(2) (a) Food infection, the invasion and growth in the body of pathogenic micro-organisms capable of producing toxins, and (b) food intoxication, a poisoning produced by toxins formed by bacteria in food before ingestion, constitute the largest and most important varieties of acute food poisoning.

(3) The organisms of the Salmonella group, particularly *B. aertrycke, B. enteritidis* and *B. suipestifer,* are responsible for the majority of outbreaks of acute food poisoning. These organisms are capable of forming a heat-resistant irritant which can produce acute gastro-enteritis.

(4) The sources from which the organisms causing bacterial food poisoning are derived are not completely known. Protein foodstuffs, particulary meat and milk products, are the vehicles of infection in the majority of instances.

(5) Laboratory methods are necessary in proving the diagnosis and etiological factors of food poisoning. They should be more frequently employed when the physician makes his initial detailed study of the case. Accurate con-

clusions presuppose the support of pertinent clinical data.

(6) The increasing number of medicolegal cases of food poisoning emphasizes the necessity for the early, complete and accurate collection of data and materials for examination in each case by all associated with the case.

(7) The prevention of bacterial food poisoning depends to a large extent upon the coordinated activities of the laboratory worker, the public health officer, the veterinarian, the nurse and the general practitioner. Rigid standards of sanitation regarding the preparation, preservation, handling and exposure of foodstuffs should be maintained.

(8) Further and extended research is needed in order to bridge the gaps in our knowledge of bacterial food poisoning.

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DISCUSSION (*Abstract*)

Dr. G. E. Brereton, Dallas, Tex.—This condition is met quite frequently and often inaccurately diagnosed. It seems to me the expression "ptomaine poisoning" should be completely discarded together with that other model of inaccuracy, "indigestion." Both of these terms are still used very frequently in medical as well as lay circles.

There is still much work to be done on bacterial food poisoning. There are also several other groups of food poisoning, not to mention the numerous other conditions that may cause acute digestive and abdominal disturbances. All must be remembered in making a diagnosis.

Bacterial food poisoning usually occurs quite sporadically and unexpectedly. It is usually of short duration and self-limited in course. It is rarely fatal. Mortality is greater in the aged and debilitated. There is little variation by season or latitude. It is encountered more frequently in canned foods. These cases start suddenly and end quickly. One attack confers no immunity. Like any other disease, there is wide variation of symptomatology in different outbreaks and even in different cases of the same outbreak. Cotter quotes several cases with splenic enlargement as a differential point.

Most of these cases are cared for without hospitalization. Accurate laboratory work for diagnostic purposes often means additional expense to the patient and, so far as he or the practitioner can see, will do nothing to alter the course of the disease. Often neither sees till too late the medicolegal possibilities of such cases. There is not sufficient call for such studies to justify most laboratories in keeping materials for the investigation. Usually there is no legal need for reporting the cases.

Lastly, we often lack sufficient appreciation of this as a public health problem to stimulate us to the necessary steps to find the exact cause of a given outbreak. It may have originated from a food supply at a store, restaurant, picnic or church supper, with various cases under the uncoordinated care of several different physicians instead of under the care of one man or staff, as is the case if the outbreak occurs in a school, camp, or army unit.

These outbreaks are largely due to food contamination. Increased canning by governmental and other agencies may mean an increasing number of such outbreaks in the coming months. Various insects, mice and rats join the old combination of "food, flies and fingers" in supplying an important link in the transportation chain. Better precautions in food handling and better refrigeration will largely prevent them. Prompt consumption of food a short time after adequate cooking is a most important preventive measure.

Clinically we cannot care for a given case better because we happen to know it has been due to any one of the several different organisms mentioned by Dr. Goforth. Nor will this information change its course and outcome unless the diagnosis be definitely botulism. Most cases recover anyway. Careful investigation, however, will make us better prepared for the next such case. It will give us a better support if medicolegal angles develop. It will give us a better opportunity to do preventive medicine in possibly protecting others from the same source. It will help develop interest to provide the proper legislation concerning food care and handling, as well as the reporting of such cases. It may also help stimulate interest in discovering much that is now unknown in this field.

We should handle our cases of suspected food poisoning with a broad diagnostic prospective and what Dr. Goforth has termed "an informed alertness."

ALLERGIC DERMATITIS*

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The term, allergic dermatitis, in its present implication, is generic rather than specific. It is not my intention in this paper to enter into arguments regarding the concepts of eczema, but it is my purpose to enumerate certain practical observations in the management of allergy as it pertains to the human skin. The terms, eczema, dermatitis venenata, generalized neurodermite, lichen chronicus simplex disseminatus, and those of like implication, will be strictly avoided.

For the purposes of convenience, the classification of allergic dermatitis as proposed by Coca[1] and his coworkers will be used. Coca proposes a classification of dermatoses of allergic origin by dividing them into three groups, namely: atopic eczema, contact dermatitis, and the cutaneous manifestation of infectious allergy, and tabulates important differences in these groups as regards etiology, diagnosis, and treatment. In this paper a consideration of characteristic features will be attempted, and preliminary observations concerning methods of treatment which are now being studied will be summarized. No attempt will be made to discuss serum sickness, urticaria, or the various forms of drug sensitization.

The diagnosis of allergic dermatitis is not always easy. Little is known concerning the pathology or the mechanism of allergy as it affects the skin. Sulzberger and Wise[2] have pointed out certain histological differences depending upon the portion of the skin affected. It is the consensus that atopic dermatitis affects the cutis, while contact dermatitis affects the epidermis. It is frequently difficult to differentiate allergic dermatitis from conditions entirely unrelated to allergy, or from conditions which are complicated by allergy. Furthermore, it is not easy in suspected cases to differentiate one type of allergic dermatitis from another. Clinically, the appearance of the conditions are many times indistinguishable and a proper differentiation sometimes baffles our most astute dermatologists.

Frequently, however, the history justifiably predicates the diagnosis. To obtain a worthwhile history, one must possess practical knowledge of the large variety of possible etiologic agents and must be familiar with all medical factors which could conceivably influence dermatitis.

The presence of one group of allergic dermatitis does not deny the existence of another in the same individual. We have frequently demonstrated contact dermatitis as a complication of atopic dermatitis. Fungus infections also complicate the appearance and the clinical course of other types. As a history is just begun during the first few visits, the most valuable diagnostic asset is a careful and well kept diary, consisting of a record of all food taken, variations in symptoms, and of activities which include contact with possible offending substances. Even in chronic cases, a few visits sometimes serve to enlighten patients sufficiently to enable them to detect the etiologic agent. The behavior of all allergic phenomena should be kept in mind.

In the management of atopic dermatitis, intracutaneous and scratch tests are of demonstrable, though at times questionable, value. Some patients react to almost all intracutaneous tests, while others show little or no reactions. While of no value in the atopic group, patch tests in contact dermatitis are usually of considerable importance; although, it must be emphasized that a positive patch test by no means signifies that the particular reacting substance is the causative agent. This may be illustrated by the commonly known fact that most of us show positive reactions to rhus toxicodendron. The difficulty of testing and treating an out-of-town patient should here be emphasized, especially in the treatment of atopic individuals. In most instances, time does not permit the infinitesimal number of tests sometimes necessary to make a diagnosis. As the methods of testing differ in the various groups, it is necessary, first of all, to try to identify properly the group to which a patient belongs.

Successful treatment consists in the removal, when possible, of the causative substances or in efforts to induce desensitization. The patient should not be deprived of a well balanced diet, by dietary restriction, for a long period of time. Great care should be taken concerning the health of these patients. Hyposensitization to food has been found generally unsatisfactory. In certain instances, it may be carried on successfully by mouth feedings as observed by

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Keston.[3] In the contact cases, various types of hyposensitization have been employed with varying degrees of success. As a whole, efforts to desensitize patients by the intramuscular injection of plant oils have been of considerable value. Various observers disagree on this point. It has been necessary in many instances, however, to modify the dosages as proposed by Coca.[1] We are unable, in many cases, to give as large doses as he suggested, on account of constitutional reactions, which simulate untoward reactions noted in the administration of too large doses of pollen antigen. It has thus been necessary, in several patients, to prolong treatment and to increase the doses gradually with oils of vegetable origin. Multiple sensitivity is frequently noted. If it is demonstrated that the patient's contact with many reacting substances cannot be prevented, treatment with each substance must be instituted. Failure to observe this often results in therapeutic failure.

ATOPIC DERMATITIS

This term designates a condition of the skin due to familial allergy and conforms to the criteria of asthma and hay fever, for example. Etiologic factors may be the same as those which cause bronchial asthma. It usually begins before adult life. The methods of testing and diagnostic study are essentially the same. Scratch tests and intracutaneous tests are of value in less than 50 per cent of the cases. Our experience indicates that the information gained by such tests is greatly augmented by tests done according to the Prausnitz-Kustner method of passive transfer.

The usual appearance of atopic dermatitis, especially when associated with asthma, rhinitis, or allergic digestive disturbances, is that of a dry, papular, erythematous rash, involving the flexor surfaces of the arms and legs, and frequently the neck and body. In many instances, however, there are no distinctive features, and localized areas of dermatitis of food origin are not uncommon. Several times we seemed to be dealing with dermatitis of atopic origin, later to find that our diagnosis was incorrect.

Difficulties of this sort may be well illustrated by the history of a man, aged 51, who first appeared in our clinic in 1930. He gave a history of some type of infantile dermatitis and a doubtfully positive familial history of allergy in his antecedents. The eruption involved the popliteal and flexor surfaces of the arms, as well as the face, hands, forearms and legs. He stated that a three days' fast had improved the condition. A return to a regular diet was followed by an exacerbation. He was placed in the hospital on a very restricted diet. There was considerable improvement on a diet of beef, spinach, eggs and toast. Doubtfully positive intracutaneous tests, as well as history and appearance, had been misleading. Later, however, several severe exacerbations were noted, one of which was definitely associated with painting and the handling of fir wood; another occurred while working with dusty furniture. Suitable patch tests with suspected materials resulted in the proper diagnosis of contact dermatitis, and recovery followed the removal of reacting substances.

CONTACT DERMATITIS

Contact dermatitis, or epidermal allergy, has been noted in early times. The sensitivity of the human epidermis to rhus toxicodendron, as well as to various substances contacted in occupational endeavor, was known many years ago. Only recently, however, has the patch test, as a means of diagnosis, been fully appreciated. The appearance, while usually that of a vesicular rash on an erythematous base, and involving chiefly the exposed areas, does not always serve to differentiate this condition from atopic dermatitis, or from fungus disease. It is uninfluenced, so far as is known, by heredity, and occurs most frequently in adults. In acute cases, the history alone frequently establishes the diagnosis. In the chronic cases, however, especially in patients whose dermatitis is of non-occupational origin, it is frequently necessary to resort to a detailed study of the patient's environment in an effort to detect the etiologic agent.

The most valuable diagnostic procedure is the use of patch tests, as popularized by Jadassohn. Intracutaneous, scratch and passive transfer tests are of no value. A small quantity of the suspected material is placed on the unbroken skin, covered with cellophane held in place by adhesive, and allowed to remain for twenty-four hours. Reactions of considerable severity, however, may necessitate the removal of patches sometimes within a few minutes. In the use of materials which may also act as atopic agents because of their reagin content, the skin is scratched, and the patient is allowed to wait for a few minutes before the patch is covered. This gives us in substance a scratch and a patch test with the same procedure. A positive reaction is indicated by the reproduction at the test site of the original lesion. The reaction may appear after several days. It was formerly thought in our Clinic that the patches must be left in place for at least five days. Sulzberger[4] advances the idea, however, that in many instances when patch tests are left for such a long period of time the individual is apt to be-

come sensitized, and thus a false interpretation results. At present we are checking the reaction of patients on whom we have formerly done patch tests. Thus far, we have found a few positive reactions that were formerly negative. We have also noted that several patients have become sensitive to adhesive after its frequent application for the purpose of patch tests.

The treatment of contact dermatitis is best carried out by avoiding contact with the offending substance. However, this is frequently impossible. In our experience, a valuable adjunct in the treatment of these conditions is the method of desensitization with oils, as proposed first in the treatment of ivy dermatitis and later proposed by Brown, Milford and Coca[5] in the treatment of dermatitis due to other plants. Before a patient is treated by the injections of various plant oils, it should be demonstrated that the reacting oil is the causative factor. Many have been found to react to various plant or vegetable oils which could not possibly be etiologic agents. When several reacting oils are demonstrated as possible causative factors, treatment is begun by alternate injections of the various oils.

In several patients with contact dermatitis, it was noted that exacerbations followed increased contact with house dust, as occurs during the winter and during periods of house cleaning. Patch tests with various components of house dust, or with dust itself, always gave negative or doubtfully positive reactions. Intracutaneous tests, and in some instances treatment with dust extracts, were of no value.

The idea was therefore conceived of attempting to extract a contact excitant from house dust. The procedure was done according to the method of extraction of oil from plants. To my surprise, it was found that house dust yielded a considerable quantity of an oily gelatino-resinous type of material. Patch tests done with this substance gave reactions in several of these patients and failed to give reactions in normal people. When it had been demonstrated that the house dust oil was not a universal irritant, treatment was instituted by intramuscular injection of various dilutions of the oil in almond oil.

In one individual, treatment was begun with 0.5 c. c. of a 1 per cent solution. After the second injection, one week later, the symptoms of itching ceased. His skin gradually became normal and after seven weekly doses gradually increasing to 1 c. c. of 1 per cent, treatment was discontinued June 6, 1934. We expected that as soon as houses were closed, he would have an increase in symptoms such as is noted frequently in asthmatics who are sensitive to house dust. This expected exacerbation occurred about the middle of October, 1934. He was then given an injection of 1 c. c. of 1 per cent house dust oil. One week later he was found to be considerably improved. Injections were increased in concentration until his last visit, when it was noted that he had shown further improvement.

While no specificity of house dust oil is claimed, we believe that this patient, along with several others, has been improved by the employment of a regime designed to raise his tolerance to the contact excitants contained in house dust. Patch tests with dust oil were repeated at intervals during the course of the injections, and found to be as markedly positive recently as they were before treatment was begun. This observation is usual in other patients who have been treated by the injection of various plant oils, and raises the question as to the actual mechanism operative in treatment of this sort. Studies in other individuals with house dust oil are now in progress.

When oil injections are begun during the height of symptoms, the procedure is analogous to the phylactic treatment of pollenosis. Our experience indicates that injections before the expected time of the appearance of the dermatitis are of more value than injections after the height of the dermatitis is reached. It is possible that the efficiency of this method of treatment will be better appreciated when proper dosages can be fully evaluated.

In this connection, a detailed case report is given of a patient who first appeared in our Clinic last year, who gave a history of a severe dermatitis on the exposed areas, lasting from June to frost, which did not entirely disappear during the winter. It was first noticed seven summers ago and became worse each succeeding summer. He stated that working around a threshing machine caused him to be much worse and that once, while unloading oats in the winter time, he had a severe exacerbation. He showed positive intracutaneous reactions with timothy, orchard grass, red top, oats, lamb, bananas, and peas, as well as ragweed pollen. These reactions in no way altered our plan of treatment.

A patch test, consisting of a mixture of giant and dwarf ragweed oil, was applied on August 11, when the patient was first seen. One week later, he came in and stated that he was much better. No advice regarding treatment was given on August 11, but he had worn the patch, which was moderately positive, during this interval. The patch test was then left off and when seen again five days later he was worse. He was then given 0.5 c. c. of a mixture of 1 per cent giant and dwarf ragweed oil by intramuscular injection, and during the next several days was found to be much worse. A patch test was reapplied and two days later, on September 1, the patient had again noted considerable improvement. He was then given 0.2 c. c.

of ragweed oil, which resulted in an exacerbation sufficient to require sedation at night. On the next visit, the patient was again tested by the patch method with ragweed oil and on the subsequent visit was noted to have improved considerably. We also noted that tests applied at a later date were apparently beneficial in alleviating the symptoms.

It is noteworthy that the cutaneous application of ragweed oil was followed by clinical improvement, while the intramuscular injection of this oil was followed by an exacerbation. It suggests that failure by this type of therapy may be due to overdosage or improper application.

In a recent personal communication Dr. Brunsting states that he has found that the regular application of patch tests is sometimes helpful in desensitization.

During the winter, dust gathered from around a thrashing machine was extracted according to the method of extraction of vegetable oils.

The patient returned in April, 1934, and it was found that he reacted to a patch test of thrasher dust oil, as well as to stock house dust oil. Separate tests were done with giant and dwarf ragweed oil. He showed a negative test to the giant ragweed and a positive test to the dwarf. In May, 1934, injections were begun and the patient was given on alternate weeks injections of house dust oil and thrasher dust oil. The last injection was given a few weeks ago and the patient was discharged for the winter. This year he was able for the first time in seven years to work uninterruptedly at the thrashing machine. He has had very little discomfort, and practically no eruption appeared. However, patch tests applied September 19 gave a reaction as markedly positive as had been noted before.

Thus far, six patients who were previously resistant to the usual type of therapy have been successfully treated by the injections of house dust or thrasher dust oil.

ALLERGIC SKIN MANIFESTATIONS OF FUNGUS INFECTIONS

Coca compares the allergic skin manifestations of fungus infection to the tuberculin type of sensitiveness. Much is to be learned concerning the practical, as well as the theoretical, aspects of such phenomena.

The usual appearance of this type of allergic skin response to foci of fungus infections is that of a patchy, papulovesicular eruption, with marked tendency to rather constant itching. Frequently, however, this type of allergy complicates other types of dermatitis; thus, altering the course of both conditions. Occasionally, the appearance may closely simulate atopic eczema. The condition, while usually worse in summer, when fungus infections are worse, is non-seasonal.

Laboratory procedures used as aids to diagnosis include the demonstration of fungi in the focus, as well as patch or intracutaneous tests with trichophytin or oidiomycin. Sulzberger has emphasized the importance of the allergic excitant of monilia or oidium group of fungi. In some localities, sensitivity to oidiomycin, as the excitant is called, is more common than sensitivity to trichophytin. In a few foreign countries, positive reactions with extracts of fungi are of undoubted value. The frequency of positive reactions in this country, however, due to the widespread occurrence of molds, can only serve as corroborative evidence of carefully formed clinical impressions. The undesirable effects and the economic waste involved in the indiscriminate use of trichophytin and oidiomycin for testing and treatment purposes can hardly be overemphasized. Several observers, including myself, have noted general reactions of moderate severity.

The treatment of the allergic skin response to fungus infection consists in the eradication of the original focus and, if necessary, in hyposensitization. Intracutaneous administration of oidiomycin has been of particular value in several cases. The dosages as recommended by Sulzberger are applicable in our experience to only a few cases. Many have shown reactions of marked intensity to 0.1 c. c. of a 1 to 100 dilution of oidiomycin. Again, it should be stated that great care should be exercised in the use of so-called dermatomycins as diagnostic and therapeutic agents.

CONCLUSIONS

(1) A proper clinical differentiation of allergy as it affects the skin is frequently very difficult. Many patients are affected by more than one type of allergic dermatitis.

(2) An oily residue may be obtained from house dust, which is of value in the treatment as well as in the diagnosis of certain patients suffering with contact dermatitis.

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SOME IMPORTANT FACTORS IN THE PREVENTION OF TUBERCULOSIS*

By SAM E. THOMPSON, M.D., F.A.C.P.,
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This subject will be discussed under six headings:

(1) *Early Diagnosis and Prompt Treatment.*—There is no more important and effective factor in the prevention of tuberculosis than an early diagnosis made before there are softening, ulceration and bacillary sputum. No patient can possibly be a spreader of the disease before this stage is reached. At this time he is no more danger to his associates than a man with a cork leg. Before there are softening and ulceration, the case is a closed one. The bacilli are in the confines of a tubercle or mass of tubercles and have no way of escaping from the patient into the great outside. If the patient is astute enough and the physician sufficiently skilled, we should be able to find at least 50 per cent of our patients before there are germs in the sputum. So far as we know at this time, patients whose sputum is positive, especially when unrecognized, furnish our most prolific source of infection.

Forty years ago, twenty years ago, physicians could not or would not make a diagnosis unless there were germs in the sputum. It therefore followed that every patient was and had been a spreader of the disease, previous to his diagnosis. Today, with an intelligent patient and a well-trained physician, our diagnosis should be an early one. With our allergic tests, our improved technic in making physical examinations, our wonderfully improved fluoroscopic and x-ray service, we have little to offer in the way of an excuse for a late diagnosis.

In the early stages of tuberculosis, when the early diagnosis can and should be made, before there are softening and tissue destruction in the lungs, treatment offers most. If we are successful with these early cases, and we usually are, we preclude the possibility that these patients may become open cases and pass the disease on to others. Early diagnosis and prompt treatment, then, should be looked upon as important factors in the prevention of tuberculosis.

(2) *Prevent Development.*—The causes of tuberculosis may be divided into two groups: the direct and the indirect. The direct cause is the tubercle bacilli. The indirect causes are many. Anything lowering the victim's vitality and his resistance to disease lays the foundation not only for the development of tuberculosis, but for the contraction and development of any contagious or infectious disease. A perfectly sound, healthy body is one of our best protections against disease. Sometimes inheritance plays a part. To be sure we do not inherit tuberculosis; but we may and do inherit a physiological poverty, a frail and non-resistant body, which renders us an easy prey to the ravages of disease.

Dissipation along any line, alcoholism, underfeeding, bad habits, insufficient sleep, worry, anxiety, exposure, insufficient clothing or anything else that tends to lower the normal resistance of our bodies are potent factors in the development of tuberculosis. Assuming this to be true, and it has never been disputed, these factors must play an important part in preventing this disease. Remove or prevent these indirect causes of tuberculosis and a decided step will have been made toward its prevention.

(3) *Destroy All Tubercle Bacilli.*—Every case of tuberculosis is directly or indirectly contracted from an open case. So far as we know there is no other source of infection. If every patient with an open case of tuberculosis were properly instructed as to methods of prevention and would observe these methods, the further spread of the disease would be brought under complete control. The care of the sputum, covering the mouth when coughing or sneezing, separate drinking vessels and dishes properly sterilized by boiling water, separate towels and lavatories when possible, the proper handling of bedding or anything else used by the patient, are vital as agents of prevention. It is a recognized fact that a well regulated tuberculosis sanatorium, notwithstanding the presence of many open cases, is perfectly safe from the dangers of infection. As to bovine tuberculosis, dairy herds should either be certified or the milk pasteurized. This would take care of the danger of infection from this source.

(4) *Segregation.*—This method, though efficient, is not always feasible. It is not always practical or possible to remove children from a home where the father or the mother may be an open case. If the patient with an open case cannot be controlled along safe lines for the other inmates of the home, some way should be found to remove the patient. This may be accomplished by placing the patient in a sanatorium, private, county, state or Federal.

*Read in Section on Public Health, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

(5) *Municipal or County Sanatoria for Indigent Tuberculous Patients.*—The advanced indigent tuberculous patient is probably the most prolific source of infection. He is untrained in methods of prevention. His hygiene is bad. As a rule he is careless through lack of understanding. He is not in a position to protect himself or his associates or to care for his disease. These patients should be looked upon as local problems. It is not necessary or wise to send them away to sanatoria more favorably situated from a climatic standpoint. They should be cared for at home in a local sanatorium where access is easy for family and friends. Under this arrangement the patient will be much happier, live just as long and be cared for at less expense. It is a cold-blooded plan to send the advanced indigent patient away to spend the unhappy remains of his life and die surrounded by strangers who have little or no personal concern. The prime consideration in these cases is care and comfort of the patient and protection of others from infection.

Every county or group of counties should have its own local sanatoria to care for open indigent tuberculosis patients. This could be arranged for in connection with the county farm. The cost would be nominal. These patients should not be a charge on the state. The state should treat only such indigents as have a reasonable chance for an arrest. And these patients should be strictly indigents. The states and the Federal Government have gone entirely too far in the way of hospitals and the practice of medicine. Patients perfectly able to take care of themselves, who should take care of themselves, are taking advantage of this situation.

(6) *Education.*—Good health is largely a question of intelligence. Disease is largely the product of ignorance and carelessness. Disease can and should be prevented. Every sanatorium should be a school in which disease, symptoms and prevention are taught. The patient should return to his home and community a missionary against disease. But this is not enough. It is not the answer. It will not solve the problem. By this way, too few people are reached. Sanatoria, health officers and health nurses cannot cope with the situation any more than a like number of teachers could successfully teach grammar, rhetoric and arithmetic. Disease and its prevention are subjects too big to be handled in this broken, disconnected kind of way.

There is nothing mysterious or complex about the prevention of disease. There is no reason why the average child ten years of age should not grasp and comprehend it.

The solution then would be to teach it in school from a text. The A B C's of disease and prevention are not so difficult as the multiplication table, especially nine times eight or eleven times twelve. It is simple to teach that malaria is not due to bad air as was formerly taught, but to the mosquito. It is easy to teach that we can prevent the development or breeding of the mosquito or keep away from it by screens. Any child can understand that tuberculosis is not inherited, but is contracted from an open case, spitting germs. We should not expose our children to measles and whooping cough as was formerly taught. Teach that scarlet fever and diphtheria are preventable and should be prevented, educate the children of this generation in the causes and prevention of disease and it will do more to prevent tuberculosis than any method ever tried.

The reduction in the death rate from tuberculosis has been due largely to prevention. Prevention is based on education. The death rate today is less than 50 per cent of what it was twenty-five years ago. If this rate of reduction is kept up, this disease can in time be brought under complete control.

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CONVALESCENT SERUM IN POLIOMYELITIS

With the appearance of a significant number of cases of infantile paralysis in a Southern state this summer, the pathology, treatment and measures of prevention of this crippling disease are more than ever to be studied. The prophylactic value and safety of the new poliomyelitis vaccines[1] will doubtless be further investigated. In treatment of the acute condition, convalescent or immune serum has long been the only hope and its effectiveness has been steadily questioned.

Brodie,[2] of New York City, has described a formalin treated vaccine which stimulates formation of immune bodies in the blood and prevents the disease in animals. Kolmer,[3] of Philadelphia, has advocated a differently prepared vaccine. Brodie[4] has recently reviewed the role of convalescent serum in this disease, and included a discussion of its path of invasion in experimentally infected animals.

Infantile paralysis does not begin, he says, as a general systemic invasion, the virus later becoming localized in the central nervous system. Experimental poliomyelitis is an exclusively neurotropic disease, spreading only through the nerve cells and attacking only these. The virus enters the nasopharynx and passes along the olfactory nerves to the neurons of the brain stem and spinal cord, where it lodges. There is probably a specific absorption of virus by the spinal cord cells. The transmission of the virus is specifically by the nerve fibers, and it is absent from the blood stream of monkeys even after intravenous infection. It has never been isolated from the blood or spinal fluid of human cases, and has rarely been obtained outside the central nervous system. Of all tissues tested other than the nervous, Brodie has found the virus, peculiarly enough, only in the tonsils. He considers that there are no specific pathologic findings outside the central nervous system. The first stage of the disease is probably due to involvement of the midbrain, hypothalamus, and perhaps the brain stem, after which the virus seems to halt for a time before progressing to the lower parts of the central nervous system. The pathogenesis of the disease appears to preclude the possibility of beneficial effects of serum therapy. Peyton Rous[5] and coworkers have shown that in the test tube normal cells tend to protect a pathogenic virus from neutralization by immune serum. Presumably this may happen in the body. Even if an immune serum could reach the well insulated central nervous system, it probably could not dislodge the virus which appears to be fixed to or protected by the nerve cells. The neurons, or nerve cells and their processes, are involved early in the preparalytic stage, or in the incubation period of the disease; and there are many reasons to believe that immune serum cannot reach or affect them there.

Harmon,[6] of the University of Chicago, in an analysis of four thousand cases of human poliomyelitis, concluded that results in cases treated with immune serum do not differ from those in the untreated cases. A temperature drop perhaps occurs after the use of serum.

However, says Brodie, large amounts of immune serum should be tried before this treatment is condemned. Using a small group of

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monkeys in early and late stages of the experimental disease, he administered immune whole blood in quantities greatly exceeding those employed clinically. Paralysis was not arrested, but progressed in the usual way. His experimental data thus support Harmon's conclusion that statistics do not establish the therapeutic value of convalescent serum.

A more definite hope lies now in vaccination for prevention.

KIDNEYS AND PARATHYROIDS

The first operation to remove a parathyroid adenoma was performed nine years ago.[1] After removal of the tumor a bed-ridden patient was able to walk comfortably and enjoyed good health for several years, after which symptoms of muscle and joint pain recurred.

At the second operation, five years later, normal parathyroid tissue was removed and the symptoms were not relieved. It was considered probable that adenoma had recurred in a site where it was not discoverable at operation.

Lahey and Haggart,[1] of Boston, have further developed the technic for exposing and removing abnormal parathyroids. They report that the glands occur frequently under, behind and even within the thyroid substance, or well away from this gland. They have added five more cases of tumor to the list of those symptomatically relieved by operation. These were all in women, in whom they say the disease is more common than in men, which recalls the statement of Pappenheimer and Wilens[2] that the female parathyroid in the active sexual period is 22 per cent heavier than in the males. Presumably in females the parathyroid has a greater activity.

Parathyroid extract, as is well known, causes the blood calcium to rise, and probably the outstanding change in hyperparathyroidism is the elevated blood calcium and increased urinary elimination of this mineral, which eventually result in extensive decalcification of bone. There is also considerable evidence of earlier occurring kidney damage, and the syndrome suggests a rather close relationship between kidney and parathyroid function.

Urinary and renal calculi are common in parathyroid disease. Jarrett, Peters and Pappenheimer[3] have noted that if the kidney substance is experimentally reduced, the parathyroids enlarge. The glands are also enlarged in human nephritis and polycystic kidneys are to be found with some frequency in hyperparathyroidism. Kidney lesions of this disease, say Lahey and Haggart, appear before the bone changes. They are an index of its severity, while the skeletal changes are an index of its duration.

It may be concluded that the diagnosis of parathyroid tumor rests upon quantitative studies of calcium metabolism, with studies also of phosphorus metabolism, which are not very difficult to pursue; that in kidney disease of several types studies of calcium metabolism and thus of parathyroid function may be enlightening; that removal of normal parathyroid tissue has never benefited a patient.

It is conjecturable that the internal secretion of the parathyroids may be inadequate in cases of hypoplastic kidney, or any type of kidney underdevelopment. The possibility of stimulating renal growth and function in such cases by parathormone is to be investigated.

Study of the relation of parathyroids and kidneys is complicated by the fact that, as in the case of other glands of internal secretion, the parathyroids themselves are stimulated to growth by anterior pituitary extracts.[3] The number of recurrences after operation seems to be high.[1,4] In parathyroid disease, as in hyperthyroidism, removal of a local adenoma is perhaps by no means attacking the original cause of the syndrome, which may lie in a primary pituitary disturbance or elsewhere.

GLEANINGS FROM RECENT JOURNALS

Syphilis and Marriage.—The old questions of when the luetic is cured and when he may marry are still to be answered. The late distinguished Aldred Warthin,[5] after years of study of autopsy material, believed that lues is incurable; and those who work with congenitally syphilitic children would say that persons with this disease should never marry. Yet many syphilitic men

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do marry and have normal children without infecting the spouse.

There is no infallible sign which demonstrates cure, since the Wassermann and other serum tests are known not to be conclusive in this regard. The significance of the persistently positive Wassermann has been a subject for many statistical studies. Goodman and Moore,[1] of Baltimore, have made a recent analysis of more than 200 patients with neurosyphilis, nearly half of whom had a persistently positive spinal fluid Wassermann. Clinical progress of the disease, they say, occurred in 22 per cent of the Wassermann-fast patients, and in only 7 per cent of the Wassermann-negative. The Wassermann in neurosyphilis could not be taken as an absolute criterion of continued infection or its control. Wassermann-fastness, however, did not indicate inevtiable progress of the disease.

The time at which the syphilitic may marry is usually given as from three to five years from the time of infection, if the patient has been adequately treated.[2] Greenbaum, Katz and Rule[2] studied the infectivity of a group of twenty-five patients chosen at random from those who had been under treatment. Five had acute, and twenty chronic syphilis. Specimens of fresh semen from the patients were examined for spirochetes by inoculation into several rabbits. According to these authors, *T. pallida* may exist in the semen in the absence of visible lesions. Conversely, patients with active symptoms after a short course of treatment may have non-infectious semen. Not a single patient of the twenty-five gave a positive test. All the semens were non-infectious after treatment. It was concluded that rabbit inoculation offers a useful method of testing the luetic who insists upon marriage.

Positive evidence of infection would doubtless be worth more than negative, since these patients must be liable to secrete spirochetes at any period of neglect of therapy or of decline of the general health.

Active Substance of Maggots.—Baer's maggot treatment of osteomyelitis is esthetically the most objectionable method which modern physicians have ever seriously advocated.

Since its successful introduction many attempts have been made to extract from these unlovely insects a chemical which would enable the therapist to dispense with crawling creatures. Allantoin is said to encourage epithelialization of wounds and ulcers.[3] It is a substance found in embryonic fluids, in fetal urine, in various plants, and formed also by the oxidation of uric acid.[4] According to Robinson, of the United States Department of Agriculture, it occurs in the secretions of maggots, and is of wide biological distribution. Weak solutions, he reports, expedite the healing of old wounds. It was employed as far back as 1912 for this purpose, and was said at that time to stimulate the healing of gastric and duodenal ulcers, but was later forgotten. It has been produced commercially for some years.

Lymph Flow in Cardiac and Renal Edema.—In the edema of cardiac and renal disease there is disturbance of the flow of lymph, which may be demonstrated if certain dyes are injected into the skin. Normally, dye deposited in the skin drains into the deeper lymph channels and the appearance is soon like that of colored streamers, long or short, radiating from the site of injection.

In individuals with cardiac disease and edema of the lower limbs, the lymphatic capillaries are widely dilated, the dye enters more readily than in normal skin, and travels away at a faster rate. There is some retrograde flow, due to valvular incompetence of the lymphatics, which shows in isolated colored islands several centimeters from the site of injection, below and around it. The islands are never seen in normals. There is never any formation of colored streamers in cases of cardiac edema despite the dilatation of the lymphatic channels. In edematous legs of cardiacs there is a breakdown of lymphatic transportation.

In nephritic edema there are also wide lymphatic capillaries, though narrower than those of the cardiac. Signs of incompetence of the valves are not encountered. The dye streamers appear promptly after intradermal injection. Within three or four minutes they have the ap-

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pearance assumed in normals after half an hour. The lymph flow is abnormally rapid.

The two conditions, cardiac and nephritic edema, are thus differentiated, says McMaster,[1] by the rate of lymph flow in the edematous skin. In nephritics it is excessively rapid and in cardiacs there is a virtual stagnation of the lymph.

TWENTY-FIVE YEARS AGO

FROM JOURNALS OF 1910

Cure of Fibroid Tumors without Removal.[2]—"I believe that extensive adhesions furnish more nourishment to a fibroid than the ovarian or uterine arteries. * * * Case 3 * * * patient had suffered with fibroid for ten years, possible weight 15 lbs. * * * Made the incision as in the former cases, broke up all possible adhesions. Patient made an uninterrupted recovery, flooding ceased and the tumor disappeared in less than two years. * * * Since the success of this operation I never remove a uterus for fibroid tumors."

Oratory at a State Meeting.[3]—"On Wednesday evening the exercises were public, and consisted of the Monitor's address, by Dr. Charles A. Mohr, of Mobile, and the Annual Oration, by Dr. John Pope Stuart, of Attalla. Dr. Mohr's address was on the subject of Ethics. * * * The Annual Oration was a gem of purest ray serene. Its subject was Love, and if any beautiful simile, gorgeous imagery or elegant phraseology was omitted from its construction, it was not missed. Though the speech was long, the speaker held the large audience enthralled until its close."

Vaccination in Pyelitis.[4]—"There can be little doubt that infections of the urinary tract due to the colon bacillus are favorably affected by vaccine treatment. The subjective improvement is oftentimes striking, and pain and frequency of micturition are quickly relieved."

"Habitina as a Morphine Cure.[5]—"A chapter in the Great American Fraud entitled 'The Scavengers' deals with those individuals who claim to cure the drug habit by mail. * * * Practically all of these advertised remedies are simply the drug itself in concealed form. No effort is made to save the patient. The whole purpose is to substitute for the slavery to the drug purchased from the corner pharmacist the slavery to the same drug, disguised, purchased at a much larger price from the 'Doctor' or 'Institute' or 'Society.'

"One of these vicious and dangerous 'cures' is 'Habitina,' a nostrum advertised by the Delta Chemical Co., of St. Louis, for the 'positive cure' of the 'morphin and other drug habits. * * * A gradual reduction treatment for all pain-alleviating and sleep-producing drugs.'

"* * * A free sample of this 'cure' may be had on application. * * * Those writing for it receive a half ounce bottle of liquid containing eight grains of morphin sulphate and four grains of heroin hydrochlorid.

"* * * Any man, woman or child who cares to go to the trouble of writing for this stuff can, at a total expenditure of two cents, get enough morphin to kill seven or eight people. There is not a reputable drug store in the United States that would dare to give a layman eight grains of morphin on no other authority than his simple request."

The Public and the Medical Profession.[6]—"The public is a self-constituted critic, prejudiced against the profession and clamoring for demonstrated achievement, but it is also like a great child needing to be led into the way of cleanliness, godliness, and health. With the spirit of today the public is ready for education, and we owe it to ourselves to go more than half way in the effort to instruct it. When that day comes in Utopia when the state will care for all its sick, educate, train and keep its staff of physicians, lay restriction of community obligation to health on all citizens, provide for the prevention of disease by instruction in schools and in the communities of peoples, as well as the means to safeguard the individual, then our labors will have ceased, but until such a dream is realized, we must continue to knock at the door of the Empire of Hygeia, begging the spiritual and economic aid of all to further our cause, always humanitarian in its purpose and conservative in its results."

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6. Isadore Dyer in the Southern Medical Journal. Reprinted in J.A.M.A., **54**:1026, 1910.

Correspondence

POTENTIALLY DANGEROUS ERROR IN JUNE JOURNAL

Editor, SOUTHERN MEDICAL JOURNAL:

I note in my article, "The Bradycardias and the Tachycardias: Bedside Diagnosis and Treatment," in the June JOURNAL a glaring and dangerous error which I unfortunately did not catch in my copy to you nor in my proof-reading. On page 563, column 2, line 13 of the first new paragraph, I have "Barium chloride, 30-50 grains." This should read "Barium chloride 30-50 milligrams." The dose is about thirty times too large and might result seriously should anyone prescribe the drug in that quantity.

W. W. BONDURANT, JR.

San Antonio, Texas, June 14, 1935.

St. Louis—Where We Meet

ST. LOUIS WILL WELCOME YOU!

It was on the evening of February 14, 1764, that a little band of French pioneers first landed on the west bank of the Mississippi River, at what is now the foot of Walnut Street in St. Louis. For many days, patiently fighting the current, they had poled and dragged their heavy craft up the great river from Fort De Chartree, sixty miles below. Wearied by their labors, they slept that night on their boat. Like the landing of the Pilgrim Fathers, the coming of this "First Thirty," as they became known in colonial days, proved a milestone which marked the beginning of an empire.

One hundred and seventy-one years later—to be exact, on November 19, 1935, another band of Pilgrims will land on the west bank of the "Father of Waters" to open the twenty-ninth annual meeting of the Southern Medical Association.

The building of this great Middle Western metropolis was started on the morning of February 15, 1764, when August Chouteau, leader of the "First Thirty," led his men across the sandy beach and up the plateau overlooking the river, pointing out to them a line of blazed trees. The ringing blows of axes soon sounded through the woods, and the building of St. Louis began.

Those were indeed pioneer days, days when three European powers, England, France and Spain, contended for a continent. Other expeditions, French and Spanish, soon sought to overshadow the little settlement of St. Louis. But so well had the site been chosen and so energetically had the founders labored that these competitive efforts gradually merged with St. Louis itself.

Within three years its colonists, by sheer force of spirit, had established valuable fur trading monopolies with the twenty-eight principal Indian nations. Within five years the fur trade of St. Louis had grown to the amount of $80,000 annually, a great sum in those days.

Each year thereafter saw the city's radius of influence lengthen. St. Louis became the gateway of the stream of migration, the starting point of expeditions in all directions. Some were military, to establish forts; some scientific, to explore and exploit; some were to establish communities to open commercial avenues. The Lewis and Clark Expedition in 1804, opening the Northwest, was one of these.

So, too, the Frenchmen of St. Louis paved the way for the American occupation of Louisiana. A branch of the Chouteaus started Kansas City. Robidoux of St. Louis established St. Joseph. One of the Menards founded Galveston. A hundred Western cities and towns owe their beginnings to St. Louisans.

The year 1811 marked the appearance of the Mississippi steamboat. Five years later the first steamboat came up the river, and for a half a century thereafter river trade grew by leaps and bounds.

In 1861 came the Civil War. Missouri, on the borderland between North and South, suffered most cruelly, more than one-tenth of its battles being fought upon Missouri soil.

St. Louis today, one of the most modern commercial cities in America, still has its background of more than a century of historical events. No visitor in St. Louis is ever at a loss as to what to do or what to see. Members of the medical profession and their wives who visit St. Louis next November will enjoy seeing the Art Museum, Cahokia Mounds, Chain of Rocks Park, the Confederate Memorial, the Dent House, Eads Bridge, Forest Park, Grant's Log Cabin, Jefferson Memorial, the Lindbergh Trophies, the Old Court House, "Ol' Man River," Shaw's Garden, St. Louis Municipal Airport, Zoological Gardens, and many other outstanding attractions.

The St. Louis Zoo, by the way, is one of the world's most famous zoos. This Zoological Garden is not only an interesting feature, but a vast educational institution.

Fountain and Lily Pond in Forest Park.

Likewise it is known as a model for the care of wild animals. Experts concerned with the captivity of wild animals have come to St. Louis from all parts of this country and abroad to study the ideal methods used here, and particularly to examine the unusual arrangements by which the animal dens and paddocks have been transformed into near-to-nature haunts.

The zoo occupies 77 acres in Forest Park. Its more than 1,964 living creatures, including mammals, birds, fish, reptiles and amphibians, have been collected from all parts of the globe. Here are to be seen the famous cageless bear pits, erected at a cost of more than a quarter of a million dollars; the new monkey house,

*Prepared by Mr. Frederick H. Rein, Director of Conventions and Publicity, St. Louis Convention and Publicity Bureau, for Dr. R. V. Powell, St. Louis Chairman of Publicity for Southern Medical Association meeting.

filled with simian life of every description, where trained monkeys solemnly go through their amusing antics every afternoon; the largest steel-enclosed bird cage in the world, with its fascinating variety of bird life; the swan lakes, peopled by a strange world of swimming birds, and which also serves as a sanctuary for passing flocks of wild ducks and geese on their migrations; the new reptile house; and Peacock Valley, with its chain of thirteen lakes teeming with aquatic life. An aquarium to cost $400,000 is soon to be added.

Huge steel and concrete structures house a comprehensive collection of wild animals: lions, tigers, leopards, and the other great cats; while in similar buildings, especially planned, are to be seen the massive elephants, hippopotami and other creatures.

Deer of many varieties and roving animals of a hundred species are confined in ample, steel-fenced yards. Thousands of people throng this zoo, for its sights are so interesting and so unusual that its attractions never grow old. Here, on Sunday afternoon, parked automobiles from a dozen states are often seen.

The cageless bear pits, which have attracted the notice of zoological experts from all over the world, are artificial rocky dens with earth-filled fissures from which grow native shrubbery and evergreens. They are exact concrete reproductions of the limestone bluffs along the Mississippi River, from which detailed photographs, plaster casts were especially made as models. Dim caves serve as cool retreats for the bears, and rugged paths permit them to scale the rocks for a certain distance toward the overhanging crests.

The bears, confined on three sides by this rocky formation, apparently have nothing to prevent their strolling out along the promenades toward freedom. Actually, however, the animals are confined on the open side by a wide moat banked by a concrete shelving which the bears cannot climb, even though they swim the moat. Only a low steel rail seemingly separates these great pacing wild creatures from the near-by spectators, who thus obtain the most natural of close-up views. One's hand in a pocket is the signal for an uprising of all the bears in sight, who rear high on their hind legs in clumsy demand for the peanuts which they consider their rightful tariff.

The unique method of exhibiting wild animals in their native surroundings has proven so satisfactory that accommodations of similar type have been provided for many other creatures in the zoo. The famous Hagenbeck and other animal experts of international reputation are cooperating in this extension.

When you visit the zoo in Forest Park you will also want to see the Jefferson Memorial, an imposing marble structure in the same park which stands on the site of the main entrance of the World's Fair. Here one can see relics of the Mound Builders, whose faces no white man ever saw; curios of the Indian tribes who traded with the founders of St. Louis; original manuscripts of the French and Spanish days in Missouri; relics of the pioneers and of the Revolutionary, Mexican, Spanish-American and World Wars; and ancient records of Missouri courts.

In addition to the third largest collection of Jefferson manuscripts in this country, a large portion of the manuscripts of the Hamilton-Burr controversy, which culminated in the death of one and the destruction of the career of another brilliant man, are exhibited here.

Many of the manuscript records of the Lewis and Clark Expedition repose in the display cases. The letter of credit given to Lewis and Clark is the only one of its kind ever given by a President of the United States to an individual. It carried the credit of the United States Treasury for expenditures incurred.

Among the exhibits in the Memorial and of supreme interest today is the complete showing of the famous Lindbergh collection, including gifts, medals, trophies and souvenirs from a score of foreign countries and from thousands of sources. This collection occupies one entire wing of the building. Col. Lindbergh is a loyal St. Louisan and has chosen the Jefferson Memorial, with the Missouri Historical Society as custodian, as the permanent resting place for the mementoes which have come to him in connection with the epoch-making flight of the "Spirit of St. Louis" across the Atlantic and his friendship tour of the countries of Mexico, Central and South America.

St. Louis, the site of the 1935 annual meeting of the Southern Medical Association, offers you untold opportunities for relaxation and enjoyment.

Book Reviews

Physical Diagnosis. By Warren P. Elmer, B.S., M.D., Associate Professor of Clinical Medicine, Washington University School of Medicine; Assistant Physician to Barnes Hospital, St. Louis, and W. D. Rose, M.D., Late Associate Professor of Medicine in the University of Arkansas, Little Rock, Arkansas. Seventh Edition. 919 pages, illustrated. St. Louis: The C. V. Mosby Company, 1935. Cloth, $8.00.

There are no great changes in the book at this time. The chapter on electrocardiography has been entirely rewritten and new material has been added on aortic murmurs, silicosis and diagnostic methods. This text gives a complete presentation of physical diagnosis in a pleasing manner and well deserves the popularity which it has gained.

Martini's Principles and Practice of Physical Diagnosis. Edited by Robert F. Loeb, M.D., Associate Professor of Medicine, College of Physicians and Surgeons, Columbia University, and Presbyterian Hospital, New York City, from the authorized translation by George J. Farber, M.D. 213 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1935. Cloth, $2.00.

This book has for its object the development of the students' technic of percussion and auscultation. The writer has studiously limited himself to these older methods, believing if they are well developed the practitioner will do a more informative examination. Very little attention is given to symptomatology. The summaries of pulmonary and cardiac findings as shown by the roentgen ray and physical examination are very practical. There are no special diagnostic methods described for the osseous, reproductive, nervous, muscular or urinary systems, but a careful adaptation of the methods given will effect a high degree of efficiency in diagnosis.

Anesthesia and Analgesia in Labor. By Katharine G. Lloyd-Williams, M.D., B.S. (London), Honorary Anesthetist to the Royal Free Hospital, Including the Obstetrical and Gynecological Unit; Honorary Anesthetist to the Elizabeth Garrett Anderson Hospital; Anesthetist to the Eastman Dental Clinic (Royal Free Hospital) with a foreword by Dame Louise McIlroy, D.B.E., D.Sc., M.D. (Glasg.), D.Sc. (Lond.), D.Sc. (Hon. Caus., Belfast), M.R.C.P., F.C.O.G., Professor of Obstetrics and Gynaecology, London (Royal Free Hospital) School of Medicine for Women. 96 pages, illustrated. Baltimore: William Wood & Co., 1934. Cloth, $2.00.

This small brochure discusses in detail the agents and methods used for the relief of pain in obstetrics. These drugs are grouped according to the stage in labor in which they have proven most valuable. The discussions are quite adequate and bring to the attention of the accoucheur many useful ideas. The writer gives credit for the use of oxygen-carbon dioxide mixtures in infant resuscitation to Dame McIlroy. The reference to this work is given as November to December, 1933. Yandell Henderson published an article on the same subject in the *New England Journal of Medicine* November, 1928.

Ten Years of Rural Health Work, Rutherford County, Tennessee, 1924-1933. By W. Frank Walker, Dr.P.H., Director of Health Studies, The Commonwealth Fund. 82 pages, illustrated. New York: The Commonwealth Fund, 1935. Paper.

This book portrays the work of the Commonwealth Fund in Rutherford County for the past ten years. (A book by Dr. Mustard, the first director, covering the first five years, was reviewed in this column December, 1930.) In the last five years there appears to be an improvement in the number of stillbirths, puerperal deaths, and deaths under one year. The book states that the tax is ten cents per hundred dollars for health work. An account is made of the present status of the work and the future plans of the work are laid out.

Bee Venom Therapy. Bee Venom: Its Nature and Its Effect on Arthritic and Rheumatoid Conditions. By Bodog F. Beck, M.D. 238 pages. New York: D. Appleton-Century Company, 1935. Cloth, $5.00.

This monograph represents an excursion into the superstitions and traditions that are linked with bee stings and bee venom. The writer in his explanatory notes gathers together a collection of material which he sifts to the reader in small doses, much in the way testimonials are given to the public. He describes the composition and the various methods of collecting the bee venom, the effect of bee stings upon an individual and their treatment.

After a few words concerning terminology, etiology, symptomatology and pathology of rheumatic and rheumatoid conditions he takes up "apitherapy." In the discussion of the treatment he does not give a single case report of his own, falling back on those of other authors, and finally ends with another chapter of testimonials. The work lacks scientific thoroughness, and while it may provoke a few men to try this form of therapy, will probably not popularize this form of treatment as is hoped by the writer.

Southern Medical News

ALABAMA

Dr. James S. McLester, Birmingham, was inaugurated President of the American Medical Association at its annual meeting in Atlantic City in June.

Dr. Alfred A. Walker, Birmingham, was elected a member of the Council on Scientific Assembly of the American Medical Association at its annual meeting in Atlantic City in June.

Dr. Seale Harris, Birmingham, recently gave a clinic at Duke University School of Medicine, Durham, North Carolina.

Dr. William D. Gaines, Lafayette, was recently appointed physician to the State prison at Atmore.

Dr. Cornelius S. Hagerty, formerly of Chicago, recently received an appointment as Assistant Professor of Bacteriology and Pathology at the University of Alabama School of Medicine, University.

Dr. Leslie G. Cole was recently appointed in charge of the Bullock County Health Department to succeed Dr. Ernest G. Moore, Union Springs, who resigned for private practice in Tallassee.

Dr. Martin L. Shaddix, Phenix City, was recently named Health Officer of Russell County.

Dr. Lee Weathington, Boaz, was recently appointed Health Officer of Marshall County.

Dr. Hugh C. Nickson was recently appointed Health Officer of Chilton County, heading a new full-time health unit.

Dr. Myrtus R. McWhorter, Woodland, was recently appointed full-time Health Officer of Randolph County.

The Jefferson County Medical Society had as guest speaker at a recent meeting Dr. Roy R. Kracke, Emory University School of Medicine, Atlanta.

Deaths

Dr. Horace Ollie Sparks, Piedmont, aged 55, died May 15 of acute nephritis.

Dr. Alfred Byrd Phillips, Dora, aged 74, died March 5 of lobar pneumonia and diabetes mellitus.

Dr. John William Hooper, Roanoke, aged 70, died March 18.

Dr. John Hackworth Wood, Sweetwater, aged 70, died February 23 of lobar pneumonia.

ARKANSAS

Dr. A. S. Gregg was recently appointed City Health Officer of Fayetteville.

Dr. J. H. Weaver was recently appointed Health Officer of Hope.

Dr. B. V. Powell was recently reappointed Health Officer of Camden.

Dr. Ralph M. Sloan, Jonesboro, was recently appointed a member of the State Board of Nursing Examiners.

Dr. William Hibbitts, Texarkana, was recently elected a Director of the Lions Club of that city.

Dr. J. O. Rush, Forrest City, was recently elected a Director of the Rotary Club of that city.

Dr. Ralph Sloan, Jonesboro, was recently elected Vice-President of the Rotary Club of Jonesboro.

The Crawford County Medical Society held their annual banquet in Van Buren, May 7.

Dr. Pat Murphey, Little Rock, is in London, England, taking postgraduate work in mental and nervous diseases at the National Hospital.

Dr. A. A. Blair, Fort Smith, is taking postgraduate work at Johns Hopkins University, Baltimore.

Dr. J. C. Blackwood, formerly of Harrison, has moved to Western Grove.

Dr. Charles E. Kennedy and Miss Mary Johnson, both of Smackover, were married March 29.

Deaths

Dr. Callie F. Johnson, Hatfield, aged 72, died March 17 of mitral insufficiency.

Dr. Joseph Alfred Robinson, Hot Springs National Park, aged 71, died recently of cholelithiasis.

Dr. W. H. Plummer, Winfield, aged 66, died April 11 of heart disease.

DISTRICT OF COLUMBIA

The Medical Society of the District of Columbia elected the following officers for the coming year: Dr. Sterling Ruffin,

President; Dr. John Minor, First Vice-President; Dr. Fred R. Sanderson, Second Vice-President; Dr. Coursen B. Conklin, Secretary-Treasurer.

Dr. William Thornwall Davis, Professor of Ophthalmology, George Washington University School of Medicine, Washington, recently gave a clinic at Duke University School of Medicine, Durham, North Carolina. He was also guest speaker at the Mississippi State Medical Association meeting in Biloxi in May.

Dr. John R. Wood, formerly of Manila, Philippine Islands, is now located at the Walter Reed General Hospital, Washington.

Dr. Edward J. Schwartz on April 1 resigned as Assistant Health Officer of the District of Columbia.

Dr. Hill Carter, Washington, and Miss Devereux Stokely were married April 27.

Dr. James Edwin Wissler, Washington, and Miss Lola C. Johnson were married March 24.

DEATHS

Dr. William Duncan McKim, Washington, aged 80, died April 11.

FLORIDA

Dr. H. Marshall Taylor, Jacksonville, was elected President of the American Bronchoscopic Society at its annual meeting in Toronto early in June. Dr. Taylor is also President of the Southern Medical Association.

The Florida State Medical Association elected the following officers for the coming year: Dr. Herbert L. Bryans, Pensacola, President; Dr. Orion O. Feaster, St. Petersburg, President-Elect; Dr. Eugene G. Peek, Ocala, Dr. John W. Alsobrook, Plant City, and Dr. J. Turberville, Century, Vice-Presidents; Dr. Shaler A. Richardson, Jacksonville, reelected Secretary.

Dr. Hewitt Johnston, Orlando, recently returned from taking postgraduate work in the East.

Dr. George Dame, Inverness, has been elected head of the Grand Chapter of Royal Arch Masons of the State of Florida.

Dr. L. M. Anderson, Lake City, has located in the Lake City Pharmacy Building.

Dr. Raymond Howe, Daytona Beach, and Miss Clyde Woodward were married April 8.

DEATHS

Dr. Ben Hicks Metcalf, Ruskin, aged 64, died March 31.

Dr. J. A. B. Sinclair, Miami, aged 56, died May 19 of heart trouble.

Dr. C. H. Babcock, Miami, aged 62, died May 26.

GEORGIA

The Seventh District Medical Society elected the following officers for the coming year: Dr. H. J. Ault, Dalton, President; Dr. P. O. Chaudron, Cedartown, President-Elect; Dr. William Harbin, Jr., Rome, Secretary-Treasurer.

The Habersham County Medical Society was entertained recently by Dr. and Mrs. O. N. Harden, Cornelia, at their home.

The Burke-Jenkins-Screven Medical Society recently met in joint session with the druggists of the three counties for a dutch dinner.

The Crawford W. Long Memorial Hospital, Atlanta, elected the following officers for the coming year: Dr. M. T. Harrison, President; Dr. C. E. Lawrence, Secretary.

The Morgan County Medical Society elected the following officers for the coming year: Dr. W. M. Fambrough, Bostwick, President; Dr. C. B. Palmer, Rutledge, Vice-President; Dr. W. C. McGearly, Madison, Secretary-Treasurer.

The Stephens County Medical Society elected the following officers for the coming year: Dr. J. H. Terrell, Toccoa, President; Dr. E. F. Chaffin, Toccoa, Vice-President; Dr. C. L. Ayers, Toccoa, Secretary-Treasurer.

The Walker County Medical Society elected the following officers for the coming year: Dr. F. H. Simonton, Chickamauga, President; Dr. R. M. Coulter, LaFayette, Vice-President; Dr. R. F. Payne, LaFayette, Secretary-Treasurer.

The Ben Hill County Medical Society elected the following officers for the coming year: Dr. E. J. Dorminy, Fitzgerald, President; Dr. G. W. Willis, Ocilla, Vice-President; Dr. L. S. Osborne, Fitzgerald, Secretary-Treasurer.

The Crisp County Medical Society elected the following officers for the coming year: Dr. T. J. McArthur, Cordele, President; Dr. Charles Adams, Cordele, Vice-President; Dr. J. N. Dorminy, Cordele, Secretary-Treasurer.

The Murray County Medical Society elected the following officers for the coming year: Dr. J. M. Daves, Blue Ridge, President; Dr. R. H. Bradley, Chatsworth, Vice-President; Dr. E. H. Dickie, Chatsworth, Secretary-Treasurer.

The Blue Ridge Medical Society elected the following officers for the coming year: Dr. J. M. Daves, Blue Ridge, President; Dr. J. S. Tankersley, Ellijay, Vice-President; Dr. C. B. Crawford, Blue Ridge, Secretary-Treasurer.

The Houston-Peach Counties Medical Society elected the following officers for the coming year: Dr. J. W. Story, Perry, President; Dr. H. E. Evans, Perry, Vice-President; Dr. R. L. Cater, Perry, Secretary-Treasurer.

The Campbell County Medical Society elected the following officers for the coming year: Dr. W. R. Camp, Fairburn, President; Dr. R. T. Camp, Fairburn, Vice-President; Dr. A. J. Green, Union City, Secretary-Treasurer.

The Tri-County Medical Society elected the following officers for the coming year: Dr. George B. Hack, Hinesville, President; Dr. B. Harrison Gibson, Allenhurst, Secretary-Treasurer.

Dr. and Mrs. D. H. Garrison, Tate, entertained the doctors of Cherokee and Pickens Counties at their home recently.

Dr. Roy R. Kracke, Emory University, was guest speaker at the Jefferson County (Alabama) Medical Society recently.

Dr. Albert R. Rayle, Atlanta, has opened offices in the Grant Building.

Dr. J. D. Mangham, formerly of Tifton, has located at Alamo.

Dr. William Harbin, Jr., and Miss Elizabeth Warner, both of Rome, were married April 24.

Dr. Clarence Dixon Fowler and Miss Mary Susan Prim, both of Atlanta, were married April 19.

Dr. David Manning Wolfe and Miss Georgia Louise Neal, both of Augusta, were married April 23.

Dr. Ross Parker Cox, Rome, and Mrs. Julia B. Holland were married March 5.

DEATHS

Dr. Wyatt Hutchins Alexander, Blakely, aged 60, died April 17.

Dr. Archie Griffin, Valdosta, aged 65, died May 2 of pneumonia.

Dr. Walter Andrew Crowe, Smyrna, aged 78, died April 4.

Dr. William Burnam Godard, Macon, aged 53, died March 10 of lobar pneumonia.

Dr. Fred Young, Demorest, aged 51, died March 29.

KENTUCKY

Dr. Ernest B. Bradley, Lexington, was elected President-Elect of the American College of Physicians at its annual meeting in Philadelphia early in May. Dr. Bradley has been a member of the Board of Governors of the College for several years. He is also immediate Past-Chairman of the Section on Medicine of the Southern Medical Association.

Dr. Chauncey W. Dowden, Louisville, was elected a member of the Board of Governors of the American College of Physicians at its annual meeting in Philadelphia in May. Dr. Dowden is also a member of the Council of the Southern Medical Association.

The Knox County Medical Society elected the following officers for the coming year: Dr. M. A. Bizzell, Artemus, President; Dr. W. P. Clifton, Louisville, Vice-President; Dr. F. R. Burton, Barbourville, Secretary-Treasurer.

The Kentucky State Medical Society dedicated a memorial to Jane Todd Crawford at McDowell Park, Danville, May 30.

Dr. C. W. Dowden, Louisville, was guest of honor at a dinner at the Echo Country Club, St. Louis, given by Dr. J. Curtis Lyter.

The Letcher County Medical Society held a banquet in the Daniel Boone Hotel recently.

Dr. O. J. Seibert, Cincinnati, was guest speaker at a recent meeting of the Grant County Medical Society.

DEATHS

Dr. Joseph Callahan Bussey, Louisa, aged 76, died March 27 of arteriosclerosis, chronic nephritis and uremia.

Dr. Alfred T. Bennett, Louisville, aged 94, died March 16 of coronary thrombosis.

Dr. William Nelson Offutt, Lexington, aged 58, died April 3.

Dr. John Everette Siler, Lot, aged 57, died March 3 of multiple sclerosis.

Dr. William Royster Thompson, Lexington, aged 64, died April 29 of pneumonia.

LOUISIANA

The Louisiana State Pediatric Society elected the following officers for the coming year: Dr. Charles J. Bloom, New Orleans, President; Dr. Ruth Aleman, New Orleans, Vice-President; Dr. J. A. Crawford, Lake Charles, Secretary-Treasurer.

The Fourth District Medical Society had as guest speaker at a recent meeting Dr. Charles L. Scudder, Boston.

Dr. Harry Johnson Schmidt, Convent, and Miss Margaret Mary Heath were married May 25.

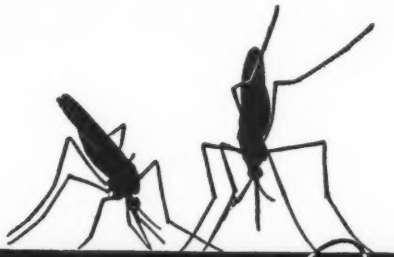
DEATHS

Dr. Field Vernon Gremillion, Alexandria, aged 56, died March 27.

Dr. Numar M. Hebert, Covington, aged 88, died May 2.

Dr. C. A. M. Dorrestein, New Orleans, aged 61, died April 16.

Continued on page 18



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The 5-day treatment of malaria with Atabrine not only promptly relieves all symptoms but also assures eradication of the parasites so that a cure results more rapidly and more certainly than with any other antimalarial agent.

MINIMAL RELAPSE RATE
The revolution which Atabrine is creating is based on its remarkable property to prevent relapses. With a "short quinine" course —comparable to that mentioned in a League of Nations report—Barrowman recorded relapses in 90 per cent of 235 cases observed for six months. After treatment with Atabrine the rate was only 9 per cent in a series of 371 cases. When Atabrine was supplemented with Plasmochin, relapses were further reduced to 3.5 per cent in 255 additional cases.

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Estivo-autumnal malaria is more widely prevalent in the Southern States than is commonly believed. "The opinion that Atabrine is superior to quinine for the cure of primary attacks of malignant tertian (estivo-autumnal) malaria rests upon a large number of reports relating to natural cases."—League of Nations Report.

COMFORTABLE TO PATIENTS
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Continued from page 678

MARYLAND

The Medical and Chirurgical Faculty of Maryland elected the following officers for the coming year: Dr. Frederick D. Chappelear, Hughesville, President; Dr. Harvey G. Beck, Baltimore, Dr. Jesse O. Purvis, Annapolis, Dr. Norman S. Dudley, Church Hill, Vice-Presidents; Dr. Walter Dent Wise, Baltimore, Secretary; Dr. Joseph Albert Catard, Baltimore, Treasurer.

Dr. C. Leroy Ewing, Baltimore, was recently elected President of the Maryland Society of Bacteriologists.

Dr. Alan M. Chesney, Dean of The Johns Hopkins University School of Medicine, Baltimore, recently addressed the students and staff of Duke University School of Medicine, Durham, North Carolina.

Dr. Harvey B. Stone, Johns Hopkins University School of Medicine, delivered the Webster Root Memorial Address at the annual initiation of Alpha Omega Alpha at the University of Virginia School of Medicine, Charlottesville, recently.

Dr. Mabel I. Silver, who is on furlough from her station at Tiama, West Africa, has returned to Baltimore.

Dr. James S. Dryden, formerly of Jeffs, Virginia, has moved to Oakland.

DEATHS

Dr. Charles Emil Brack, Baltimore, aged 69, died April 3 of myocarditis.

MISSISSIPPI

The Webster County Medical Society elected the following officers for the coming year: Dr. E. F. Arnold, Bellefontaine, President; Dr. J. D. Turner, Eupora, Secretary.

The East Mississippi Medical Society held their semi-annual meeting at Meridian June 6.

Dr. George Hicks, who has been doing graduate study in New Orleans, has returned to Vicksburg for the practice of medicine.

DEATHS

Dr. Willie Cabe Weathersby, Coahoma, died recently.

Dr. J. Wesley Price, Booneville, aged 63, died March 25 of septic thrombosis and pyemia.

Continued on page 20

THE NEW YORK POLYCLINIC

MEDICAL SCHOOL AND HOSPITAL

(ORGANIZED 1881)

(The Pioneer Post-Graduate Medical Institution in America)

Plastic Reparative Surgery

This course includes diagnosis and determination of treatment; pre-operative preparation; anesthesia; operative technique; dressings; postoperative care; with special reference to utilization of the skin and other tissues in correction of disfigurement and replacement of loss, congenital or acquired. Operations on the cadaver. Particular attention is given to lectures, studies and demonstrations of advances in surgical anatomy, pathology, etc., with special reference to the problem actually under consideration.

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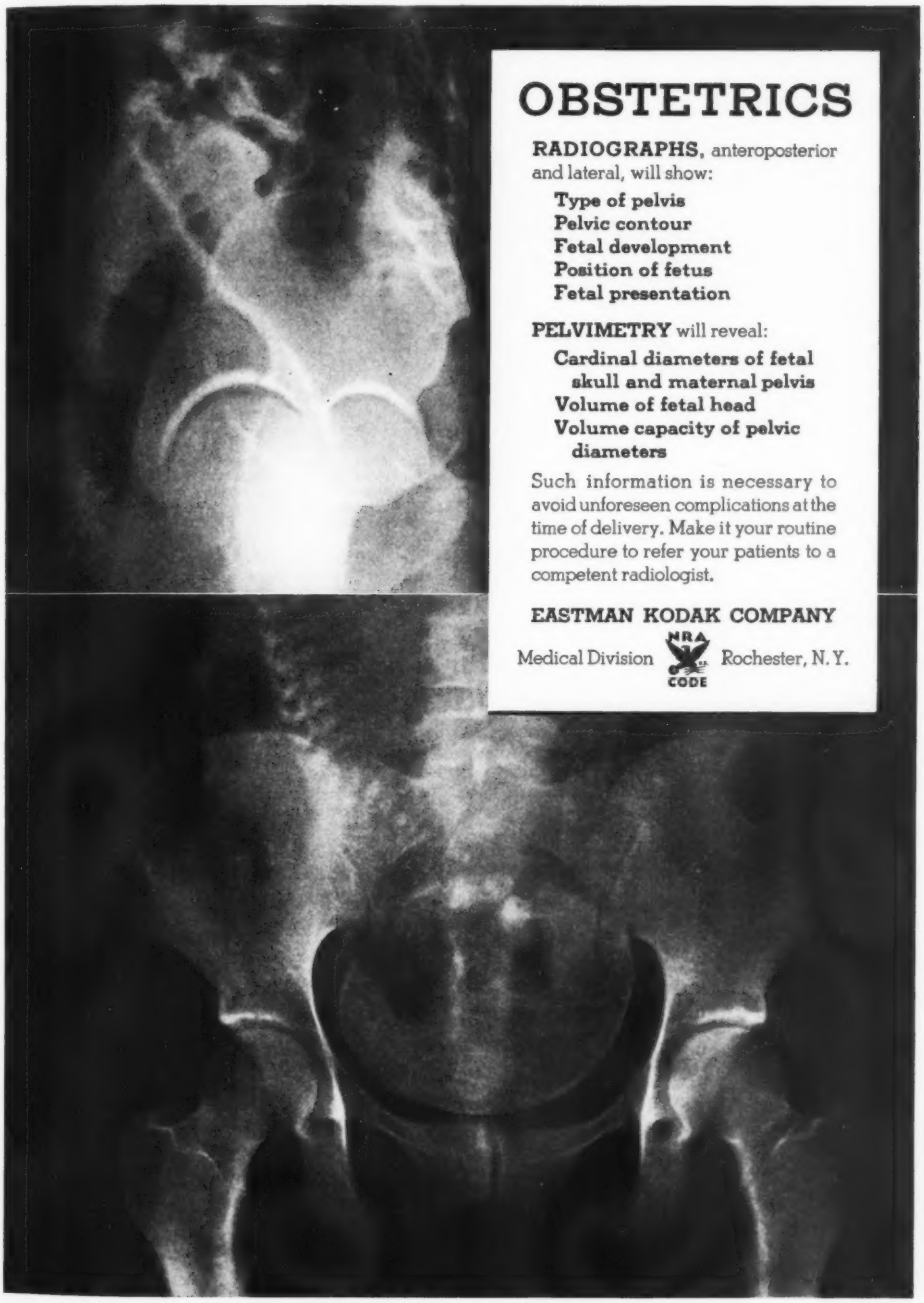
An intensive course. Surgical treatment of chronic suppuration of the lung (Pulmonary Tuberculosis, Abscess of the Lung, Bronchiectasis) and Tumors of the lung. Surgical lesions of the esophagus, heart and diaphragm. Empyemas.

FOR INFORMATION ADDRESS

MEDICAL EXECUTIVE OFFICER: 345 West 50th Street, NEW YORK CITY


OBSTETRICS
RADIOGRAPHS, anteroposterior and lateral, will show:
Type of pelvis
Pelvic contour
Fetal development
Position of fetus
Fetal presentation
PELVIMETRY will reveal:
Cardinal diameters of fetal skull and maternal pelvis
Volume of fetal head
Volume capacity of pelvic diameters
Such information is necessary to avoid unforeseen complications at the time of delivery. Make it your routine procedure to refer your patients to a competent radiologist.
EASTMAN KODAK COMPANY
Medical Division
NRA CODE
Rochester, N. Y.

Radiographs Provide Diagnostic Facts

Continued from page 18

Dr. Walter Ford Henderson, Jackson, aged 43, died in April.

Dr. Percy Campbell Overstreet, DeKalb, aged 52, died April 13 of heart disease.

Dr. Thomas O. Douglass, Eupora, aged 67, died in April of heart disease.

Dr. C. C. McEachern, Moss Point, aged 60, died in April.

Dr. W. W. McRae, Corinth, aged 70, died in May.

Dr. William Daniel Potter, Clinton, aged 62, died in May.

MISSOURI

Dr. David P. Barr, St. Louis, has been elected Vice-President of the American College of Physicians.

Dr. Henry J. Elrich, St. Louis, was recently appointed Superintendent of the St. Louis Isolation Hospital, succeeding Dr. John Eschenbrenner, who resigned May 1 to enter private practice in Ardmore, Oklahoma.

Dr. J. Curtis Lyter, St. Louis, was host at a dinner given for Dr. C. W. Dowden, Louisville, Kentucky, at the Glen Echo Country Club recently.

Dr. James Quarles Chambers, Jr., Kansas City, and Miss Mary Josephine Crane were married April 13.

DEATHS

Dr. James Wallace Horner, Alma, aged 81, died March 15 of hypostatic pneumonia.

Dr. John H. Sutter, St. Louis, aged 63, died March 29 of carcinoma.

Dr. John W. Phemister, Houston, aged 69, died February 21 of carcinoma of the sigmoid.

Dr. Ernest Mozart Roseberry, Neosho, aged 68, died March 21 of angina pectoris.

Dr. William Ford Botts, Center, aged 62, died recently of angina pectoris

Dr. Archer Wilson Paulette, King City, aged 62, died April 1 of coronary embolus.

Dr. Carl Eugene Schulte, St. Louis, aged 67, died April 10 of cirrhosis of the liver.

Dr. W. A. Norris, Columbia, aged 77, died May 28 of an acute heart attack.

Dr. Abraham U. Chase, Tiff City, aged 67, died April 4.

Dr. Robert Thomas Hill, St. Louis, aged 97, died March 23 of chronic nephritis.

NORTH CAROLINA

Dr. S. S. Hutchinson, Bladenboro, recently entertained members of the Bladen County Medical Society at a dinner.

Dr. Byrd C. Willis, Rocky Mount, has been elected President of the North Carolina Hospital Association.

Dr. Seale Harris, Birmingham, Alabama, recently gave a clinic at Duke University School of Medicine, Durham.

Dr. Alan M. Chesney, Dean of the Johns Hopkins University School of Medicine, Baltimore, recently gave a lecture to the students and staff at Duke University School of Medicine, Durham.

Dr. E. K. Marshall, Jr., Professor of Pharmacology of Johns Hopkins University, Baltimore, recently addressed the University Chapter of Sigma Xi, University of North Carolina, national scientific research society.

Dr. Foster Kennedy, Professor of Neurology, Cornell University School of Medicine, New York, recently lectured to students at Duke University School of Medicine, Durham.

Dr. W. H. Kibler, Morganton, has returned from Chicago, where he took postgraduate work at the Cook County Hospital.

Dr. G. M. Billings, Morganton, has returned from New York, where he took postgraduate work.

Dr. James E. McClees, formerly of Scotland Neck, has located in Bath for the practice of medicine.

Dr. Benjamin Franklin Cozart and Miss Helen Rebekah Newell, both of Reidsville, were married May 18.

DEATHS

Dr. Clyde Richard Nicholson, Statesville, aged 45, died April 13 of hypernephroma of the right kidney.

Dr. Edward Ferdinand Corbell, Sunbury, aged 74, died April 11.

Continued on page 22

Clifton Springs Sanitarium and Clinic

Founded 1850

Large staff covering general medicine, surgery, and the specialties. Combines advantages of rural Spa and metropolitan hospital and clinic. Special attention to metabolic and nervous diseases. Newest equipment for deep X-ray therapy. Special rates to teachers, ministers and missionaries.

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Superintendent
CLIFTON SPRINGS - - NEW YORK

The Ella Oliver Home

A private maternity home for the care and protection of unfortunate girls during pregnancy and confinement.

Under auspices of Women's Christian Association of this city.

Staff physician in daily attendance or may have any other ethical physician. Modern hospital equipment, graduate nurse. Rates very reasonable. Adoption or board arranged for babies.

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Established 1903. Strictly ethical. Location delightful summer and winter. Approved diagnostic and therapeutic methods. Seven buildings, each with separate lawns, each featuring a small separate sanitarium, affording wholesome restfulness and recreation, in doors and out doors, tactful nursing and homelike comforts.

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Founder

J. A. McINTOSH, M.D., F.A.C.P.
Superintendent

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In train, auto, steamer, plane —*anywhere*—here is a safe milk for the traveling baby.

KLIM is fresh, whole cow's milk with only the water removed. A dry powder, it can be carried *anywhere* without refrigeration, yet it is quickly and easily reliquefied.

When feeding time comes, away from home, the bottle is the matter of a moment—with a container of KLIM, a vacuum bottle of warm boiled water, and a few shakes in a Mason jar.

Most important, no formula change is required. With KLIM you can prescribe exactly the same whole milk modification that the baby has thrived upon at home. Simply substitute reliquefied KLIM for the regular milk in the feeding.

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Please send me KLIM literature and pocket formula calculator. Check here to receive samples. ☐

..... M.D.

Street .....

City ..... State .....

Continued from page 20

OKLAHOMA

Dr. F. H. Norwood, Prague, was recently appointed Health Officer for Lincoln County.

Dr. J. C. Rembert, Okmulgee, was recently appointed County Superintendent of Health of Okmulgee County.

Dr. D. L. Perry, Cushing, was recently appointed Health Superintendent of Payne County.

Dr. Benjamin B. Kies, McAlester, was recently appointed Health Officer of Pittsburg County.

Dr. Benjamin F. Johnson, Fairview, was recently appointed Health Officer of Major County.

Dr. Henry B. Fuston, Bokchito, was recently appointed Health Officer of Bryan County.

Dr. Catherine F. T. Brydia, Ada, was recently appointed Health Officer of Pontotoc County.

Dr. Henry K. Speed, Jr., Sayre, was recently appointed Health Officer of Beckham County.

Dr. Edwin S. Patterson, Antler, was recently appointed Health Officer of Pushmataha County.

Dr. William P. Jenkins, Okemah, was recently appointed Health Officer of Okfuske County.

DEATHS

Dr. Karl P. Hampton, Semino'e, aged 58, died recently of adenocarcinoma.

Dr. Edgar Eynon Chivers, Mannsville, aged 59, died recently of pneumonia.

Dr. Ross Fred Terrell, Stigler, aged 59, died March 14 of spinal meningitis

Dr. William Eugene Settle, Wynne Wood, aged 68, died recently of myocarditis.

Dr. C. W. Austin, Mangum, aged 74, died April 3.

SOUTH CAROLINA

Dr. Kenneth M. Lynch, Charleston, was elected First Vice-President of the American Medical Association at its annual meeting in Atlantic City in June.

Dr. William A. Farmer, formerly of the American Hospital in Paris, has returned and opened offices at Anderson.

Dr. C. Howard Cain, formerly of Orange, Virginia, has located in Conway.

Dr. John M. Fleming, Spartanburg, and Miss Caroline Z. Miller were married recently.

Dr. Robert Wilson, Jr., Charleston, and Miss Gabrielle Palmer McColl were married April 27.

TENNESSEE

Dr. H. H. Shoulders, Nashville, was elected Vice-Speaker of the House of Delegates of the American Medical Association at its annual meeting in Atlantic City in June.

Dr. Hugh J. Morgan was recently elected Professor of Medicine in the Vanderbilt University School of Medicine, effective September 1, succeeding Dr. C. Sidney Burwell, who is to be Dean and Professor of Research Medicine of Harvard University Medical School, Boston.

Dr. Hubert Turley, Memphis, recently opened offices in the Medical Arts Building.

Dr. Louis Leroy, Memphis, has moved to 1210 Madison Avenue.

The McMinn County Medical Society elected the following officers for the coming year: Dr. R. W. Epperson, Athens, President; Dr. S. B. McClary, Sr., Etowah, Vice-President; Dr. L. A. Brendle, Englewood, Secretary-Treasurer.

The Sumner County Medical Society elected the following officers for the coming year: Dr. J. J. Gwin, Hartsville, President; Dr. R. N. Buchanan, Hendersonville, Vice-President; Dr. Homer Reese, Gallatin, Secretary-Treasurer.

Dr. Jack Alexander McKenzie, Jackson, and Miss Edith Woodard were married May 18.

DEATHS

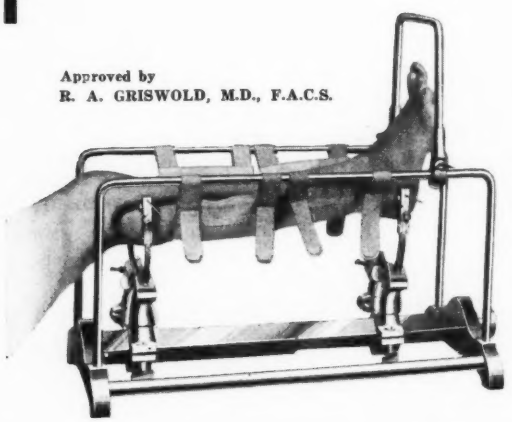
Dr. William R. Froneberger, Maryville, aged 60, died recently.

Continued on page 24

DE PUY REDUCING FRAME AND SPLINT

For Lower Leg Fractures

Approved by
R. A. GRISWOLD, M.D., F.A.C.S.



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● Reprint of technique on request. Write also for our free fracture book.

DE PUY MFG. CO. WARSAW, IND.

Readily ASSIMILABLE FAT -- an essential in FEEDING THE PREMATURE

IN a recent study of fat metabolism in infants, Holt, Tidwell and Kirk* report that olive oil showed the highest percent retention (95.1%) of all fats studied but one, olein (97.5%). These authors found the fat of SIMILAC (which is 20% olive oil) showed a better percent retention (92.6%) than butter fat (88.9%)—and as high a retention as breast milk fat (92.4%).

To quote these authors—"the differences in fat retention on these various fats as shown on normal infants are not great; for the normal infant it is probably immaterial whether he absorbs 85% or 95% of his fat intake. It seemed possible, however, that *in subjects who have difficulty in fat assimilation, such as premature infants, the observed small differences might become large differences. A few observations made on premature infants and twins have borne this out*—."

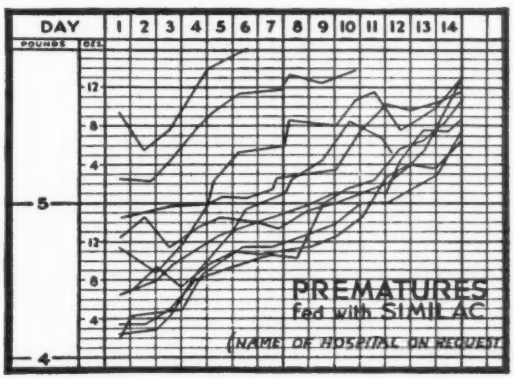
The observations referred to covered only three prematures fed on different fats, but showed an average of 78.4% retention for olive oil as compared to only 52.5% retention for butter fat.

*Holt, Tidwell and Kirk, Studies on Fat Metabolism in Infants—Acta Pediatrica, Vol. XVI, 1933.

SIMILAC

has given noticeably good results in feeding the premature infant. One of the reasons lies, as here pointed out, in the composition of its fat. Another reason is its consistently zero curd tension. The finer the curd the greater the surface area. The greater the surface area the more exposed are the fats, carbohydrates, proteins and salts to the digestive enzymes. Result . . . the food substances are more quickly and readily utilized.

SIMILAC is made from fresh skim milk (casein modified) with added lactose, salts, milk fat, and vegetable and cod liver oils.



The fact that SIMILAC is well assimilated by the immature digestive tract of the premature indicates how entirely suitable it is for all those infants who are deprived of breast milk.

M & R DIETETIC LABORATORIES, Inc., Columbus, Ohio

Delicious and Refreshing for the Convalescent

RECOVERY after illness or operations is greatly aided through the use of HORLICK'S MALTED MILK, with its remarkably nourishing and easily digestible qualities. It is readily prepared, appetizing, and particularly well suited for cases in which frequent small, light meals are indicated.

Horlick's Malted Milk Tablets offer a pleasing variant in the liquid diet.

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Stations WLW, WOR, WGN, WXYZ, WEEI, WTIC, WOAI, KNX, KGO, etc.

HORLICK'S MALTED MILK CORP.
RACINE, WIS.

Continued from page 22

Dr. Alfred J. Skiles, Kenton, aged 71, died recently.

Dr. George Monroe Peavler, Bristol, aged 76, died March 24.

Dr. Nicholas Walter Kelly, Memphis, aged 57, died March 23 of pneumonia.

Dr. Charles Daniel Chambers, Selmer, aged 46, died April 21 of peritonitis following an operation for ruptured appendix.

Dr. Edwin W Haradon, Hod Hickory, aged 72, died April 11 of cerebral hemorrhage.

Dr. John Henry Sevier, Brownsville, aged 72, died April 15 of cerebral hemorrhage.

Dr. George Potter Edwards, Nashville, aged 76, died April 29 of acute multiple arthritis and senility.

Dr. H. T. Collier, McKenzie, aged 60, died May 4 following a stroke of paralysis.

Dr. F. A. McClintock, Newcomb, aged 71, died March 28.

TEXAS

Dr. A. Bielschowsky, Professor of Ophthalmology at Breslau University, Germany, addressed the Houston Academy of Ophthalmology and Otolaryngology recently.

Dr. E. W. Jones, Wellington, has returned from Chicago, where he did postgraduate work.

Dr. Elbra Monroe, Cameron, has returned from Chicago, where he did postgraduate work.

Dr. H. Herbert Page, Houston, has been reappointed County Health Officer for two years for Harris County.

Dr. C. L. Neale, formerly of Tripler General Hospital, Honolulu, Hawaii, is now located at Fort Sam Houston.

Dr. C. L. Brothers, formerly of Schofield Barracks, Hawaii, is now located at Kelly Field.

Dr. Thomas J. Vanzant, Houston, has recently located in the Medical Arts Building.

Dr. Raymond Cohen, formerly of Des Moines, Iowa, has located in the Medical Arts Building, Houston, for the practice of pediatrics.

Dr. L. A. Boyer has moved from Terrell to El Reno, Oklahoma.

Continued on page 26

ACID RESISTANCE WITH KALAK

Hypertonic — Alkaline — Carbonated — Not Laxative

The years of experience with physicians who have used Kalak show that the use of a formula containing calcium, magnesium, sodium and potassium salts represents a correctly balanced solution. This is Kalak which, as such, aids in maintaining a balanced base reserve.

How Alkaline Is Kalak?

One liter of Kalak requires more than 700 cc. N/10 HCl for neutralization of bases present as bicarbonates. Kalak is capable of neutralizing approximately three-quarters its volume of decinormal hydrochloric acid.

KALAK WATER CO. OF NEW YORK, Inc.
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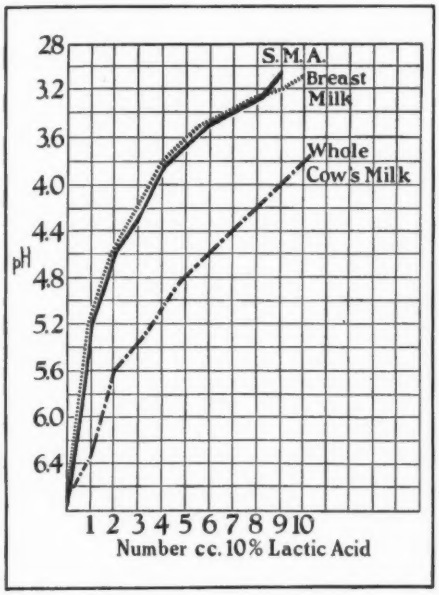
Kalak

In BUFFER VALUE *too,* S.M.A. *resembles* BREAST MILK



This buffer chart shows the close similarity between the buffer value of S.M.A. and Breast Milk and the wide difference between cows' milk and Breast Milk. *This also explains why it is not necessary to add an acid to S. M. A.*

Breast Milk from the Normal Mother is the Ideal Food for the Human Infant. That is why S.M.A. is made to resemble breast milk in percentages of carbohydrate, protein, fat and total salts (ash) content, and why even the chemical and physical constants of the fat in S.M.A. are like those of breast milk fat.

This photograph shows the equipment for determining hydrogen ion concentration necessary to plot the Buffer Curve. The chemist drops a measured quantity of acid (from the tall tube in the right foreground) into solution to be tested (in the beaker below) and records the readings from the dial before him.

S.M.A. is a food for infants—derived from tuberculin tested cows' milk, the fat of which is replaced by animal and vegetable fats including biologically tested cod liver oil; with the addition of milk sugar and potassium chloride; altogether forming an antirachitic food. When diluted according to directions, it is *essentially similar to human milk* in percentages of protein, fat, carbohydrates and ash, in chemical constants of the fat and in physical properties.

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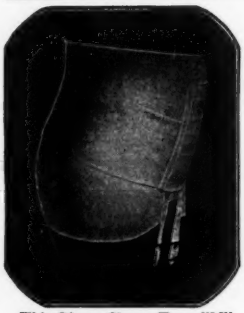
Binder and Abdominal Supporter



Gives perfect uplift and is worn with comfort. Made of Cotton, Linen or Silk, washable as underwear.

Three distinct types of Storm Supporters — many variations of each type.

This Photo Shows Type "N"

STORM supporters are made for all conditions needing abdominal uplift. Ptosis, Hernia, Pregnancy, Obesity, Relaxed Sacro-Iliac, Articulations, Kidney Conditions, Post-Operative Support, etc.

Each Belt Made to Order **Ask for Literature**

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Originator, Owner and Maker
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Continued from page 24

Dr. William G. Carnathan has moved from Kilgore to Malakoff.

Dr. A. B. Currie has moved from Junction to Rocksprings.

Dr. H. P. Curry has moved from Reagan to Marlin.

Dr. H. C. Douglas has moved from Mercedes to Monahans.

Dr. F. E. Dye has moved from Houston to Gulf.

Dr. C. H. Frank has moved from Milwaukee, Wisconsin, to Hindes.

Dr. R. L. Futrell has moved from Cuero to West Columbia.

Dr. John H. Hunter has moved from Honey Island to Houston.

Dr. J. A. Martin has moved from Big Spring to Bruni.

Dr. David McCullough has moved from Kerrville to Sanatorium.

Dr. Lemuel C. McGee has moved from Dall to Elkins, West Virginia.

Dr. H. C. Mitchell has moved from Mesquite to San Antonio.

Dr. N. T. Mulloy has moved from Turnersville to Monahans.

Dr. Charles B. Reed has moved from Snyder to Avery.

Dr. O. W. Ross has moved from Dallas to Lexington.

Dr. L. L. Starkey has moved from La Feria to Harlingen.

Dr. Earl F. Tritt has moved from Sabinal to Bastrop.

Dr. M. L. Woodward has moved from Fort Worth to Deming, New Mexico.

Dr. John W. Worsham has moved from Orange Grove to Kenedy.

Dr. Joseph Dixon Roberts, Jr., Longview, and Miss Virginia Lewis were married March 29.

Deaths

Dr. William E. McGlasson, Commerce, aged 61, died March 17 of cerebral hemorrhage.

Dr. James Henry Slaughter, Kilgore, aged 48, died recently.

Dr. James N. Reeves, Baytown, aged 73, died recently.

Dr. Marion B. Richards, Harleton, aged 59, died recently of pneumonia.

Dr. James Clyde Johnson, Richmond, aged 71, died April 22 of coronary occlusion.

Continued on page 28

Summer Diarrhea

To combat dehydration and to prevent destruction of body tissue associated with summer diarrhea, infants have immediate need for water, salts and carbohydrates.

In cases where vomiting is a symptom, withholding all fluids by mouth for a few hours may be advisable. In many cases it is best to withhold food from six to twenty-four hours. It is, however, necessary to give water during this period. Although babies bear temporary starvation they cannot get on without water.

In starting food, past experience by many physicians has shown the value of the following formula:—

Mellin's Food* **4 level tablespoonfuls**

Water (boiled and cooled) 16 ounces

It is ofttimes desirable to add ¼ teaspoonful of sodium chloride to the mixture.

Individual conditions will guide the physician in prescribing the feedings. The usual custom is to give one to three ounces of the mixture every hour or two until the stools lessen in number and improve in character.

The mixture may then be slowly strengthened by the gradual substitution of boiled skimmed milk for the water in the formula until the quantity of skimmed milk is equal to the normal quantity of milk used in the baby's formula. Finally the fat of the milk may be cautiously added.

This suggested formula furnishes nutrition well suited to protect the proteins of the body, to prevent rapid loss of weight, to resist the activity of infectious bacteria and to assist in the retention of fluids and salts in the body tissues.

Samples sent to physicians upon request.

Directions for using Mellin's Food are left entirely to the physician.

Mellin's Food Company, Boston, Mass.

**MELLIN'S FOOD: Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate—consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.*

ALL HEAT RECORDS EXCEEDED IN WEST
Heat In Midwest Kills 206 In Three Days
Mercury Exceeding 100 In Seven States
RAINS EASE HEAT, BUT PERIL REMAINS
Parched Mid-West Swelters in 100s
Drought-Scared Crops Withered by Hot Blasts, With No Rain in View
For the Physician Only
DRYCO
INFANT FEEDING SCHEDULE
From the hour of birth
For use with either DRYCO or "Special" DRYCO (Vitamin D Fortified)
Compliments of
The Dry Milk Company, Inc.
350 Madison Ave., New York, N.Y.
Mercury at 115 Sets 62-Year Record in Iowa
No Relief in Sight

SAFEGUARD THE SUMMER BABY WITH THIS SPECIAL FORMULA

Particularly suited for summer infant feeding is this easily digestible, thoroughly assimilable formula—with lowered fat and sugar values. Designed for the difficult feeding case, you will find it of special value in safeguarding infants against hot weather upsets.

Directions for this formula are in the new DRYCO infant feeding schedule. In addition, this handy guide gives you separate and specific formulas for:

- **The Normal, Well Baby** — New and remarkably successful feedings based on a principle of nutrition postulated by Nature in breast milk—never before recognized in artificial feeding tables. DRYCO's greater digestibility permits feedings that provide *highest protein values during the early months of fastest growth.*
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- **The New Born** — A new, but already widely adopted feeding procedure for your newborn cases, particularly if breast nursing is expected.

Every Bottle Fresh, Safe

Only the exact amount of DRYCO need be reliquefied for the day's feedings. No left-over milk to increase summer hazards through careless handling or improper refrigeration.

The DRYCO infant feeding schedule is sent only to registered physicians. To receive copies promptly and without obligation, mail the attached coupon.

Made from superior quality milk from which part of the butterfat has been removed, irradiated by the ultra-violet ray, under **DRYCO** license by the Wisconsin Alumni Research Foundation (U. S. Pat. No. 1,680,818) and then dried by the "Just" Roller Process.

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Please send copies of new DRYCO Infant Feeding Schedule:
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*City*_____ *State*_____
Check here to receive samples of DRYCO. ☐

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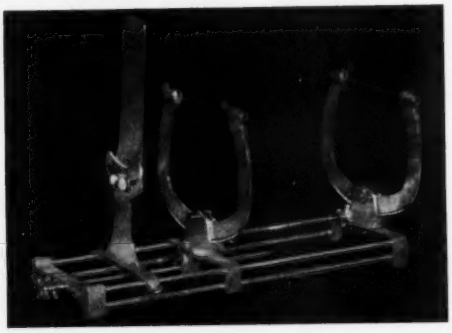
OUGHT-O-MATIC LEG SPLINT
—as devised by DR. ROGER ANDERSON—



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Splint as shown with stainless steel horseshoes, foot-plate, two stainless steel pins and pin handle $74.00

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Continued from page 26

Dr. Judge Barclay Cruse, Beaumont, aged 65, died April 22.

Dr. William M. Hilley, Sidney, aged 59, died recently.

Dr. George Emmett Bethel, Galveston, aged 40, died April 17 of chronic nephritis.

Dr. Alfred Henry Brauer, Brackettville, aged 28, died recently of cerebrospinal meningitis.

Dr. Travis Shaw Griffin, Georgetown, aged 28, died recently of meningitis.

Dr. Charles H. Wallace, Dallas, aged 72, died recently.

Dr. August Kuhn, Pflugerville, aged 66, died recently of coronary thrombosis.

VIRGINIA

Dr. James Tate Mason, now of Seattle, Washington, but who is a Virginian by birth and education, was elected President-Elect of the American Medical Association at its annual meeting in Atlantic City in June. Dr. Mason is the son of an old-time Virginia physician, receiving his degree in medicine from the University of Virginia School of Medicine.

The South Piedmont Medical Society elected the following officers for the coming year: Dr. J. J. Neal, Danville, President; Dr. H. R. Bourne, Danville, Dr. George T. Harris, Lynchburg, Dr. C. B. White, Halifax, Dr. H. C. Chambers, Phenix, Vice-Presidents; Dr. J. A. Owen, Turbeville, Secretary-Treasurer.

The Amelia County Medical Society elected the following officers for the coming year: Dr. James L. Hamner, Mannboro, President; Dr. G. C. Eggleston, Amelia, Vice-President; Dr. James L. Hamner, Mannboro, Secretary-Treasurer.

The Nansemond County Medical Society elected the following officers for the coming year: Dr. E. C. Joyner, Suffolk, President; Dr. William F. Wild, Suffolk, Secretary.

Dr. Linwood Farley, formerly of Courtland, is now located at Abingdon as assistant to Dr. Edgar C. Harper, Deputy Director of Rural Health.

Dr. George E. Waters, formerly of Baltimore, has been appointed Acting Director of the Peninsula Health District, which is composed of James City, Elizabeth City, Warwick and York Counties, succeeding Dr. C. H. Dawson, resigned.

Dr. Ned Waddell, Farmville, has been appointed Resident Physician at Southside Hospital.

Dr. J. B. Porterfield, Christiansburg, was recently appointed Health Officer of Montgomery County.

Dr. James B. McLester, Professor of Medicine, University of Alabama School of Medicine, University, recently addressed the students of the Medical College of Virginia, Richmond.

Dr. Harvey B. Stone, Johns Hopkins University Medical School, Baltimore, delivered the William Webster Root Memorial Address at the University of Virginia School of Medicine, Richmond.

Dr. Hugh H. Trout, Director and Surgeon-in-Chief of the Jefferson Hospital, Roanoke, recently delivered an address to the students of Duke University School of Medicine, Durham, North Carolina.

Dr. Gunnar Nystrom, Uppsala University, Sweden, was a recent visitor to the University of Virginia School of Medicine, University.

Dr. Charles R. Robins, Jr., Richmond, who for the past year has been First Assistant to Dr. Charles W. Mayo, at the Mayo Clinic, Rochester, has been elected a member of the Surgical Staff of the Stuart Circle Hospital.

Dr. C. Curtis Hatfield has located in Saltville for the practice of medicine.

Dr. A. T. Brickhouse, after a year's service at the CCC Camp at Fort Story, has returned to Hopewell and resumed his work as Assistant to Dr. D. Lane Elder.

Dr. Bernard C. Grigsby, formerly of Quinwood, West Virginia, has moved to Bonny Blue, where he will be associated with Dr. C. H. Henderson.

Dr. W. Fredric Delp has opened offices in the Crowell Building, Pulaski.

Dr. C. C. Freed, Waynesboro, has been elected President of the Rotary Club of that city.

Dr. W. N. Breckinridge, Fincastle, has been elected Chairman of the Botetourt County Democratic Committee.

Dr. Thomas F. Wheeldon, Richmond, has been elected Secretary-Treasurer of the Harvard Club of Virginia.

Dr. Virgil O. Choate, Galax, and Miss Millie S. Gilbert were married April 18.

Dr. Philip David Stout, Bristol, and Miss Julia Holston Slack were married April 17.

Dr. Thomas Archer Gibson, Winchester, and Miss Helen Hawke were married May 4.

Continued on page 30

Especially during pregnancy...

CALCIUM-PHOSPHORUS-VITAMIN D

Dicalcium Phosphate Compound

with Viosterol Squibb

TABLETS...CAPSULES

It is especially essential during pregnancy to make certain that the mother's diet includes sufficient calcium and phosphorus and Vitamin D.

Each *Tablet* Dicalcium Phosphate Compound with Viosterol Squibb contains 9 grains of Dicalcium Phosphate, 6 grains of Calcium Gluconate and 660 Vitamin D units U.S.P. X (1934 Rev.). They are wintergreen flavored, very palatable and may be chewed like candy.

Capsules of Dicalcium Phosphate Compound with Viosterol Squibb are particularly useful during pregnancy when nausea tends to restrict normal food intake. Two capsules are equivalent to 1 tablet — in calcium, phosphorus and Vitamin D.

Tablets Dicalcium Phosphate Compound with Viosterol Squibb are supplied in boxes of 51 tablets and the capsules in bottles of 100.

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Dallas, Texas

Continued from page 28

Dr. Edward M. Holmes, Jr., Richmond, and Miss Sarah Daily Walsh were married April 27.

DEATHS

Dr. Edward Randolph Turnbull, Lawrenceville, aged 78, died March 20.

Dr. Howe A. Jordan, Big Island, aged 82, died recently.

Dr. Blanton L. Hillsman, Richmond, aged 63, died May 17 from a heart attack.

Dr. James T. Leftwich, Highland Springs, aged 51, died June 6 of angina pectoris.

Dr. William Brodnax Banister, Petersburg, aged 74, died May 1.

Dr. Luther Addison Robertson, Danville, aged 61, died May 16 from embolism several days after an operation for hernia.

WEST VIRGINIA

Dr. James R. Bloss, Huntington, was elected a Trustee of the American Medical Association at its annual meeting in Atlantic City in June. Dr. Bloss is also Chairman of the Council of the Southern Medical Association.

The West Virginia State Medical Association elected the following officers for the coming year: Dr. C. G. Morgan, Moundsville, President; Dr. Ivan Fawcett, Wheeling, First Vice-President; Dr. Ward Wylie, Ullens, Second Vice-President; Dr. T. M. Barber, Charleston, Treasurer.

Dr. Thomas H. Blake, Buffalo, has been appointed Director of the Division of Child Hygiene of the State Health Department.

Dr. F. T. Renick, formerly of Crozet, has located at Grantsville for the practice of medicine.

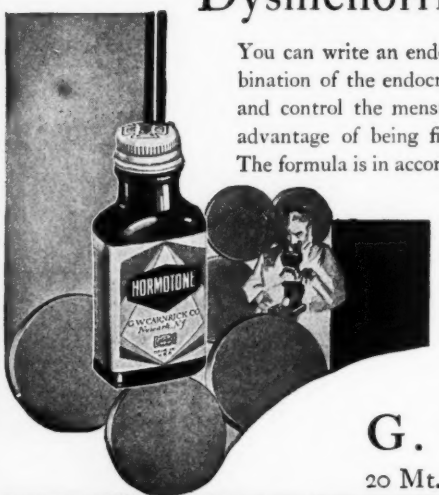
DEATHS

Dr. John Allison Coen, Cameron, aged 48, died April 9 of angina pectoris.

Dr. Louis Wilson Talbot, Elkins, aged 79, died recently.

Dr. Thomas M. Calvert, Mannington, aged 94, died recently.

An Endocrine Prescription in Dysmenorrhea and Amenorrhea



You can write an endocrine prescription in one word—a proper combination of the endocrine principles which are now known to initiate and control the menstrual process. Your prescription will have the advantage of being filled with fresh potent endocrine constituents. The formula is in accord with the most recent research on the endocrine glands concerned in regulating menstruation.

HORMOTONE

BOTTLES OF 50 AND 100 TABLETS

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Analgesic Effect of PYRIDIUM in Urinary Infections

PRACTICALLY all of the published clinical reports on Pyridium in urinary infections make special mention of the marked symptomatic relief that follows shortly after its oral administration. This analgesic effect is evidenced by

Disappearance of tenesmus . . . Abatement of referred lumbar pain . . . Relief of pain on urination.

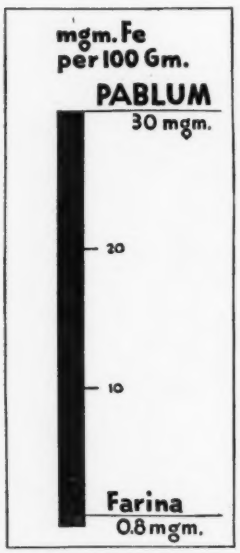
This prompt effect, in conjunction with the subsequent therapeutic influence, makes Pyridium a valuable aid in the treatment of

CYSTITIS • PYELITIS • URETHRITIS • PROSTATITIS

MERCK & CO. Inc. *Manufacturing Chemists* **RAHWAY, N. J.**

For bland diet therapy, especially ULCER cases — PABLUM

FAR too often the bland diet prescribed for gastric ulcer, colitis, and similar gastro-intestinal disorders is a deficient diet. An analysis made by Troutt of ulcer diets used by 6 leading hospitals in different sections of the country showed them to be "well below the Sherman standard of 15 milligrams" in iron and low in the water-soluble vitamins.[1] "Vitamin B would appear to be represented at a maintenance level in most cases," writes Troutt, "but the possible relation of vitamin B to gastro-intestinal functions and appetite should make one pause before accepting a low standard."



Although Pablum has a low fiber content it is 37 times richer than farina in iron and in calcium, 4 times richer in phosphorus, and 4½ times richer in copper.

Low in Fiber — High in Iron

Pablum is the only food rich in a wide variety of the accessory food factors that can be fed over long periods of time without danger of gastro-intestinal irritation. Its fiber content is only 0.9%. Yet Pablum contains 37 times more iron than farina and is an excellent source (+ + +) of vitamins B and G, in which farina is deficient. Supplying 8½ mgms. iron per ounce, Pablum is 8 times richer than spinach in iron. It must be remembered, too, that even when such vegetables as spinach are included in the ulcer diet, their iron content is reduced by sieving. Peterson and Elvehjem found, for instance, that orange juice and tomato juice contain only one-third as much iron as the whole fruit.[2]

Rich in Vitamin B

The high vitamin B content of Pablum assumes new importance in light of recent laboratory studies showing that avitaminosis B predisposes to certain gastro-intestinal disorders. Apropos of this, Cowgill says, "Gastric ulcer is another disorder which can conceivably be related to vitamin B deficiency. Insofar as the treatment of this condition usually involves a marked restriction of diet the occurrence of at least a moderate shortage of this vitamin is by no means unlikely. Obviously the length of the period of dietary restriction is an important determining factor. Dalldorf and Kellogg (1931) observed in rats subsisting on carefully controlled diets that the incidence of gastric ulcer was greatly increased in vitamin B deficiency. Observations of this type merit serious consideration."[3] Sure and Thatcher (1933) produced ulcers in rats, similar to those in human gastric ulcer, as a result of specific vitamin B deficiency.[4] Clinical observations by Dickson,[5] Elsom,[6] Larimore,[7] and Mackie[8] lead them to believe that diets low in vitamin B may be conducive to gastro-intestinal disorders, including ulcerative colitis.

Requiring no further cooking, Pablum is especially valuable during the healing stage of ulcer when the patient is back at work but still requires frequent meals. Pablum can be prepared quickly and conveniently at the office or shop simply by adding milk or cream and salt and sugar to taste. Pablum has the added advantage that it can be prepared in many varied ways—in muffins, mush, puddings, junket, etc. Further, Pablum is so thoroughly cooked that its cereal-starch has been shown to be more quickly digested *in vitro* than that of farina, oatmeal, cornmeal, or whole wheat cooked four hours in a double boiler (Ross and Burrill).

Pablum consists of wheatmeal, oatmeal, cornmeal, wheat embryo, alfalfa, yeast, beef bone, iron salt and sodium chloride.

1-8 Bibliography on request.

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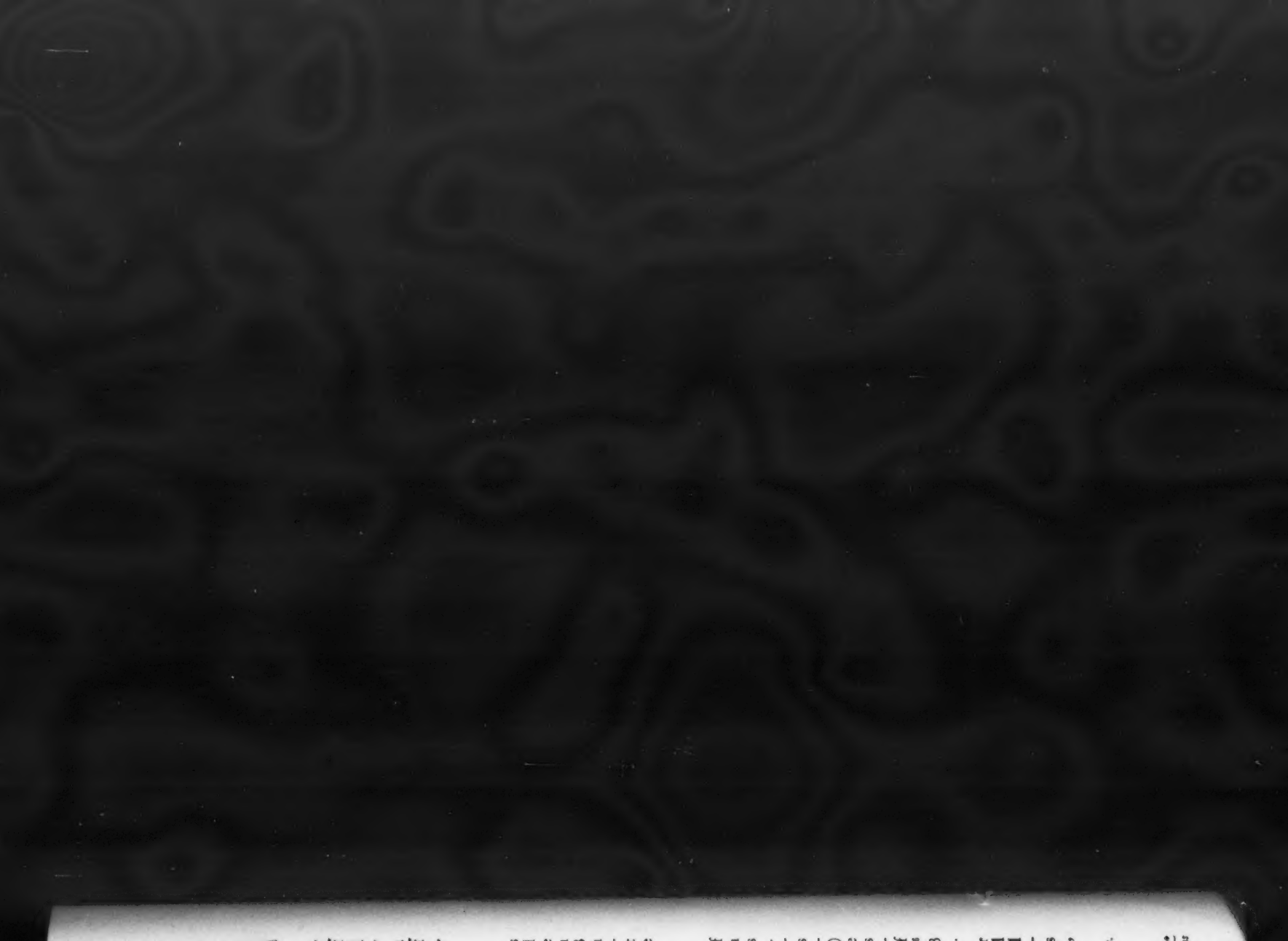
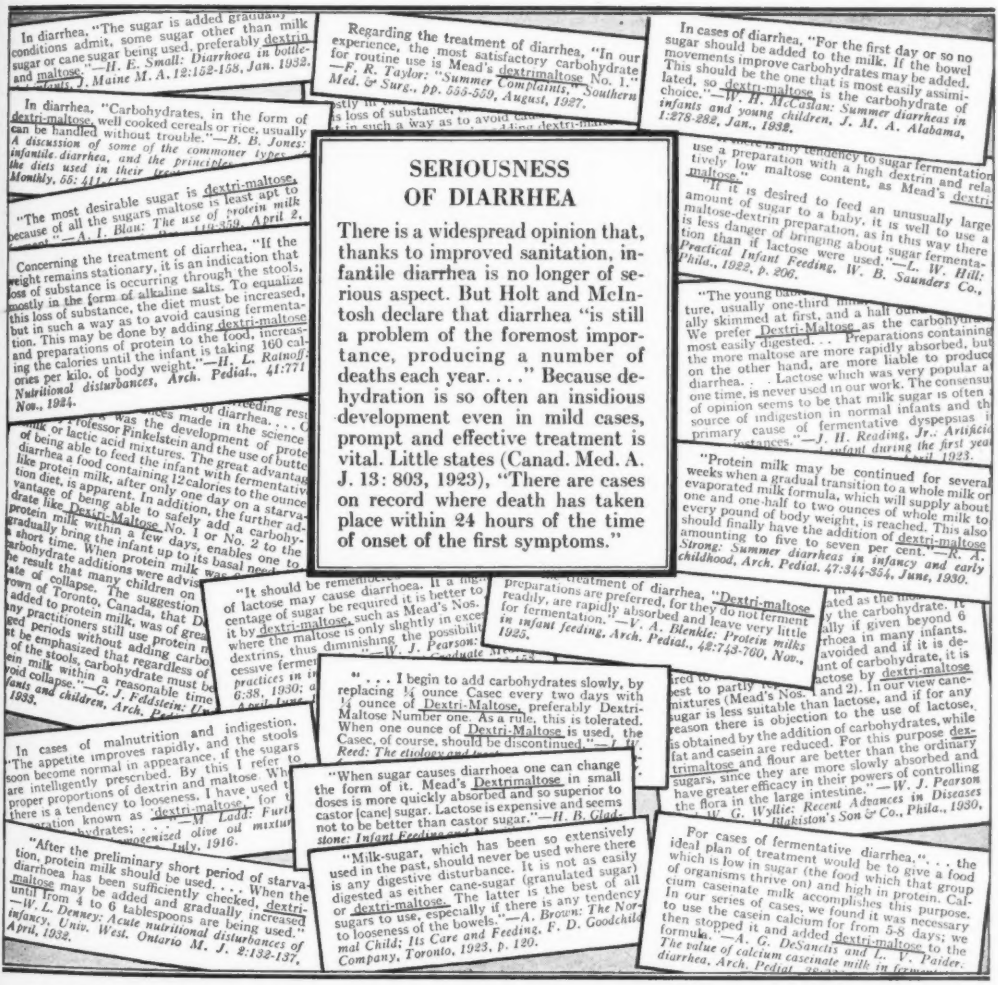


DIARRHEA

"the commonest ailment of infants in the summer months"

(HOLT AND McINTOSH: HOLT'S DISEASES OF INFANCY AND CHILDHOOD, 1933)

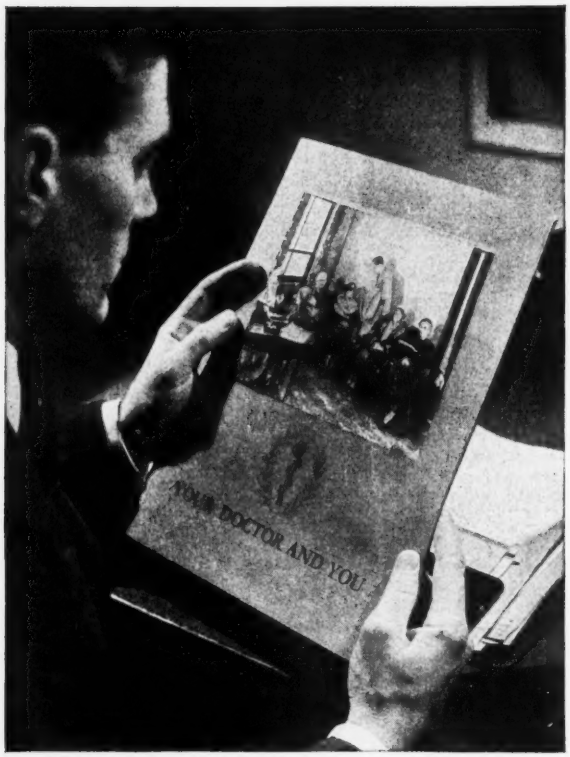
One of the outstanding features of DEXTRI-MALTOSE is that it is almost unanimously preferred as the carbohydrate in the management of infantile diarrhea.


In diarrhea, "The sugar is added gradually ... conditions admit, some sugar other than milk sugar or cane sugar being used, preferably dextrin and maltose."—H. E. Small: Diarrhoea in bottle-fed infants, J. Maine M. A. 12:152-158, Jan. 1932.
Regarding the treatment of diarrhea, "In our experience, the most satisfactory carbohydrate for routine use is Mead's dextrimaltose No. 1."—F. R. Taylor: "Summer Complaint," Southern Med. & Surg., pp. 555-559, August, 1927.
In cases of diarrhea, "For the first day or so no sugar should be added to the milk. If the bowel movements improve carbohydrates may be added. This should be the one that is most easily assimilated, so dextri-maltose is the carbohydrate of choice."—W. H. McCaslan: Summer diarrheas in infants and young children, J. M. A. Alabama, 1:278-282, Jan., 1932.
In diarrhea, "Carbohydrates, in the form of dextri-maltose, well cooked cereals or rice, usually can be handled without trouble."—B. B. Jones: A discussion of some of the commoner types of infantile diarrhea, and the principles ... the diets used in their ... Monthly, 55: 41[illegible]
SERIOUSNESS OF DIARRHEA
There is a widespread opinion that, thanks to improved sanitation, infantile diarrhea is no longer of serious aspect. But Holt and McIntosh declare that diarrhea "is still a problem of the foremost importance, producing a number of deaths each year. . . ." Because dehydration is so often an insidious development even in mild cases, prompt and effective treatment is vital. Little states (Canad. Med. A. J. 13: 803, 1923), "There are cases on record where death has taken place within 24 hours of the time of onset of the first symptoms."
"The most desirable sugar is dextri-maltose, because of all the sugars maltose is least apt to ... protein milk ... 359, April 2, ... —A. I. Blair: The use of ...
... use a preparation with a high dextrin and relatively low maltose content, as Mead's dextri-maltose."
"If it is desired to feed an unusually large amount of sugar to a baby, it is well to use a maltose-dextrin preparation, as in this way there is less danger of bringing about sugar fermentation than if lactose were used."—L. W. Hill: Practical Infant Feeding, W. B. Saunders Co., Phila., 1922, p. 206.
Concerning the treatment of diarrhea, "If the weight remains stationary, it is an indication that loss of substance is occurring through the stools, mostly in the form of alkaline salts. To equalize this loss of substance, the diet must be increased, but in such a way as to avoid causing fermentation. This may be done by adding dextri-maltose and preparations of protein to the food, increasing the calories until the infant is taking 160 calories per kilo. of body weight."—H. L. Rainoff: Nutritional disturbances, Arch. Pediat., 41:771 Nov., 1924.
"The young ... ture, usually one-third ... ally skimmed at first, and a half ... We prefer Dextri-Maltose as the carbohydrate most easily digested. . . . Preparations containing the more maltose are more rapidly absorbed, but on the other hand, are more liable to produce diarrhea. . . . Lactose which was very popular a one time, is never used in our work. The consensus of opinion seems to be that milk sugar is often a source of indigestion in normal infants and the primary cause of fermentative dyspepsias ... —J. H. Reading, Jr.: Artificial ... infant during the first year ... April, 1923.
"Protein milk may be continued for several weeks when a gradual transition to a whole milk or evaporated milk formula, which will supply about one and one-half to two ounces of whole milk to every pound of body weight, is reached. This also should finally have the addition of dextri-maltose amounting to five to seven per cent."—R. A. Strong: Summer diarrheas in infancy and early childhood, Arch. Pediat. 47:344-354, June, 1930.
... was the development in the science ... Professor Finkelstein and the use of butte ... milk or lactic acid mixtures. The great advantag ... of being able to feed the infant with fermentativ ... diarrhea a food containing 12 calories to the ounce ... like protein milk, after only one day on a starva ... tion diet, is apparent. In addition, the further ad ... vantage of being able to safely add a carbohy ... drate like Dextri-Maltose No. 1 or No. 2 to the ... protein milk within a few days, enables one to ... gradually bring the infant up to its basal need ... a short time. When protein milk was ... carbohydrate additions were advis ... he result that many children on ... ate of collapse. ... rown of Toronto, Canada, that D ... added to protein milk, was of grea ... any practitioners still use protein m ... ged periods without adding carbo ... t be emphasized that regardless of ... of the stools, carbohydrate must be ... ein milk within a reasonable time ... void collapse."—G. J. Feldstein: U ... ants and children, Arch. P ... 1933.
"It should be remembered ... of lactose may cause diarrhoea. If a ... centage of sugar be required it is better to ... it by dextri-maltose, such as Mead's Nos. ... where the maltose is only slightly in excess ... dextrins, thus diminishing the possibility ... cessive fermentation ... practices in ... 6:38, 1930; ... April-June, ...
... treatment of diarrhea, "Dextri-maltose preparations are preferred, for they do not ferment readily, are rapidly absorbed and leave very little for fermentation."—V. A. Blendle: Protein milks in infant feeding, Arch. Pediat., 42:743-760, Nov., 1925.
... ated as the most ... y the carbohydrate. It ... ally if given beyond 6 ... rhoea in many infants. ... avoided and if it is de- ... unt of carbohydrate, it is ... actose by dextri-maltose ... best to partly ... and 2). In our view cane- ... mixtures (Mead's Nos. ... and if for any ... sugar is less suitable than lactose, and if for any ... reason there is objection to the use of lactose, ... is obtained by the addition of carbohydrates, while ... fat and casein are reduced. For this purpose dextri-maltose and flour are better than the ordinary ... sugars, since they are more slowly absorbed and ... have greater efficacy in their powers of controlling ... the flora in the large intestine."—W. J. Pearson: ... Blakiston's Son & Co., Phila., 1930, ...
"... I begin to add carbohydrates slowly, by replacing ¼ ounce Casec every two days with ½ ounce of Dextri-Maltose, preferably Dextri-Maltose Number one. As a rule, this is tolerated. When one ounce of Dextri-Maltose is used, the Casec, of course, should be discontinued."—L. W. Reed: The etiology and ...
In cases of malnutrition and indigestion, "The appetite improves rapidly, and the stools soon become normal in appearance, if the sugars are intelligently prescribed. By this I refer to proper proportions of dextrin and maltose. Wh ... there is a tendency to looseness, I have used t ... ration known as 'dextri-maltose'; for t ... hydrates; ... olive oil mixtur ... July, 1916.
"When sugar causes diarrhoea one can change the form of it. Mead's Dextrimaltose in small doses is more quickly absorbed and so superior to castor [cane] sugar. Lactose is expensive and seems not to be better than castor sugar."—H. B. Glud ... stone: Infant Feeding and ...
"After the preliminary short period of starvation, protein milk should be used. . . . When the diarrhoea has been sufficiently checked, dextri-maltose may be added and gradually increased until from 4 to 6 tablespoons are being used."—W. L. Dewey: Acute nutritional disturbances of infancy, Univ. West. Ontario M. J. 2:132-137, April, 1932.
"Milk-sugar, which has been so extensively used in the past, should never be used where there is any digestive disturbance. It is not as easily digested as either cane-sugar (granulated sugar) or dextri-maltose. The latter is the best of all sugars to use, especially if there is any tendency to looseness of the bowels."—A. Brown: The Normal Child; Its Care and Feeding, F. D. Goodchild Company, Toronto, 1923, p. 120.
For cases of fermentative diarrhea, ". . . the ideal plan of treatment would be to give a food which is low in sugar (the food which that group of organisms thrive on) and high in protein. Calcium caseinate milk accomplishes this purpose. In our series of cases, we found it was necessary to use the casein calcium for from 5-8 days; we then stopped it and added dextri-maltose to the formula."—A. G. DeSanctis and ... Paider: The value of calcium caseinate milk in ... diarrhea, Arch. Pediat. ...

Just as DEXTRI-MALTOSE is a *carbohydrate* modifier of choice, so is CASEC (calcium caseinate) an accepted *protein* modifier. Casec is of special value for (1) colic and loose green stools in breast-fed infants, (2) fermentative diarrhea in bottle-fed infants, (3) prematures, (4) marasmus, (5) celiac disease.

When requesting samples of Dextri-Maltose, please enclose professional card to cooperate in preventing their reaching unauthorized persons.
MEAD JOHNSON & CO., EVANSVILLE, INDIANA, U.S.A.

YOUR DOCTOR AND YOU



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Maybe "So-o-o Big" is too big!
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The man who sentenced himself on circumstantial evidence.
He and his father would have been great pals.
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This is the lady who was afraid of hospitals.

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Please send me a copy of "YOUR DOCTOR AND YOU."

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